Pacific Northwest Rail Corridor

Amtrak *Cascades* Plan for Washington State 1998 – 2018 Update

Washington State Department of Transportation

To comment on this plan, you can

- call the WSDOT Rail Office at (360) 705-7900 or 1-800-822-2015;
- write to the WSDOT Rail Office at WSDOT, Rail Office, PO Box 47387, Olympia, WA 98504-7387;
- fax your comments to (360) 705-6821; or
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Prepared by the Public Transportation and Rail Division, Washington State Department of Transportation.

April 2000

Pacific Northwest Rail Corridor
Amtrak *Cascades* Plan for Washington State
1998 – 2018
Update

This document was formerly issued as the *Pacific Northwest Rail Corridor Intercity Passenger Rail Plan for Washington State 1998-2018*.

Prepared for the
Washington State
Department of Transportation

By
The Resource Group
In Association With
HDR Engineering, Inc.
Triangle Associates, Inc.

April 2000

Washington State
Department of Transportation

Table Of Contents

List Of Tables

Table

List Of Figures

Figure

List Of Acronyms

Acronym	
ADA	Americans with Disabilities Act
BC	Province of British Columbia, Canada
BNSF	Burlington Northern and Santa Fe Railroad
BTU's	British Thermal Units
FHWA	Federal Highway Administration
NEPA	National Environmental Policy Act
OR	State of Oregon
SEPA	State Environmental Policy Act
WA	State of Washington
WSDOT	Washington State Department of Transportation

Chapter One
Introduction

Washington State is incrementally upgrading Amtrak *Cascades* (passenger rail) service along the Pacific Northwest Rail Corridor in western Washington. The state's goal is to provide safe, faster, more frequent, and more reliable passenger rail service.

The state's vision for passenger rail in the Pacific Northwest extends over a 20-year horizon. The vision is being implemented through a step-by-step approach. Service is being increased over time based on market demand, available partners and legislative funding.

The vision of reduced travel times and better passenger rail service in the Pacific Northwest began in the late 1980s when the Washington State Legislature funded a program to improve rail depots across the state. In 1991, the Washington State Legislature directed (Substitute House Bill 1452) the Washington State Department of Transportation (WSDOT) to develop a comprehensive assessment of the feasibility of developing a high speed ground transportation system in the state of Washington.

In October 1992, the High Speed Ground Transportation Study was delivered to the Governor and the legislature. This study confirmed the feasibility of developing high speed rail in the region.

Following release of this study in April 1993, WSDOT was directed (Revised Code of Washington Chapter 47.79) to develop "high-quality intercity passenger rail service ... through incremental upgrading of the existing [Amtrak] service." The legislature

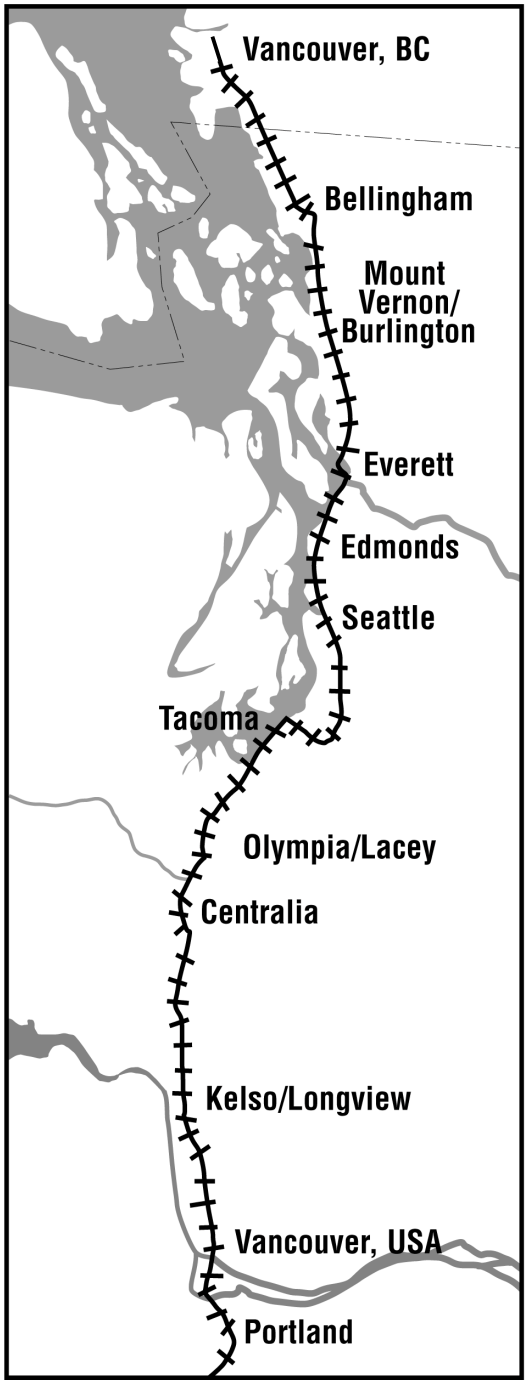


Figure 1
Pacific Northwest Rail Corridor Station Stops between Portland, OR and Vancouver, BC

believed that this step-by-step approach would help to build a "rail culture" in the region that would eventually make rail a competitive and viable alternative to automobile and commuter air travel.

By using this incremental approach, WSDOT is implementing a logical progression of infrastructure investments that improve service frequencies and performance, guided by market demand.

In the early 1990s the U.S. Department of Transportation's Federal Railroad Administration designated the Pacific Northwest one of five high speed rail corridors in the United States. This designation helps our region compete for potential federal funds to assist the state with planning and implementing improved passenger and freight rail service throughout the corridor. The Pacific Northwest is the only federally-designated passenger rail corridor in the nation with both international and bi-state ties, extending from Eugene, OR, through Washington State, to Vancouver, BC. It stretches 466 miles and includes approximately 134 miles in Oregon, 297 miles in Washington and 35 miles in British Columbia.

This document discusses passenger rail service in the segment of the corridor between Portland, OR and Vancouver, BC. The Oregon Department of Transportation is conducting its own studies for the portion of the corridor between Eugene and Portland, OR.

What Is Intercity Passenger Rail?

Intercity passenger rail connects a central city to a central city on a railroad right-of-way in densely traveled corridors. Intercity passenger rail service is typically designed to serve passengers traveling 75 miles or more. Passengers aboard the Amtrak *Cascades*, the Pacific Northwest's intercity passenger rail service, travel an average of 160 miles and typically travel to business meetings, to visit family and friends, to shop and to attend special events. Longer distance intercity passenger rail trains in the Pacific Northwest include Amtrak's *Coast Starlight* and Seattle/Portland-Chicago *Empire Builder*.

Intercity passenger rail differs from commuter rail in a number of ways. Although both forms of rail service travel along existing railroad rights-of-way, commuter rail connects a central city with its suburbs. In addition, commuter rail provides service during morning and evening commute hours. Sound Transit's *Sounder* commuter rail service will eventually share the Burlington Northern and Santa Fe Railway's (BNSF) right-of-way with Amtrak *Cascades* service.

Other modes of rail passenger travel include high speed rail, heavy rail and light rail. High speed rail, like Japan's bullet train, is a faster version of the Amtrak *Cascades* rail service. High speed rail travels at speeds greater than 110 mph and typically travels on its own dedicated right-of-way.

Heavy and light rail transit are found in dense urban areas. Both modes of transit serve urban residents for commuting as well as leisure travel. Heavy rail lines travel on their own dedicated rights-of-way and are grade-separated – either above or below ground. New York City's subway and elevated system is an example of heavy rail. Light rail, on the other hand, often shares its right-of-way with automobiles. Light rail service is often referred to as trolley service. An example of light rail is Portland's MAX system and Vancouver, BC's SkyTrain.

Where Do The Trains Run?

Amtrak operates Amtrak *Cascades* service in the state of Washington over the BNSF main line. The alignment roughly parallels Interstate 5 and runs through nine counties in western Washington: Clark, Cowlitz, Lewis, Thurston, Pierce, King, Snohomish, Skagit, and Whatcom. These trains also travel through parts of Oregon and British Columbia. The Oregon portion of the corridor is discussed in a separate document prepared by the Oregon Department of Transportation.

Who Are The Partners For The Amtrak *Cascades* Program?

Corridor development is a cooperative effort of many partners, including the states of Oregon and Washington, BNSF, Union Pacific Railroad, Amtrak, Sound Transit, the Province of British Columbia, ports, local communities, and ticket buying passengers.

Throughout the program, WSDOT and our partners are continually reviewing system improvements and negotiating cost allocations (who pays for what).

What Work Has Already Been Done Or Is Currently Underway?

Over the past six years, the states of Washington and Oregon have commissioned a series of feasibility studies to assess the practical problems, costs, and benefits of providing public investment to upgrade the corridor for fast, frequent, safe and reliable passenger rail service.

Completed projects include track, safety system and station improvements and renovations throughout the corridor.

These efforts have resulted in expanded service between Portland and Seattle (1994 and 1998); reinstated service between Seattle and Vancouver, BC (1995); expanded service between Portland and Eugene (1994); and additional service between Bellingham and Seattle (1999). New Amtrak *Cascades* service was introduced in 1999, featuring new trains built by Talgo, Inc. and upgraded customer amenities. Station improvements throughout the corridor have also been completed (Bellingham; Olympia/Lacey; Centralia; Kelso/Longview; Vancouver, WA) or initiated (Mt. Vernon/Burlington; Everett; Seattle).

To date, more than $125 million has been invested by the state of Washington. Our partners, Oregon, Amtrak and BNSF, have invested over $350 million for implementation of improvements to the overall rail system.

What Information Is Contained In This Plan?

This Plan presents information to help stakeholders and residents understand the state's Amtrak *Cascades* service.

This Plan highlights efforts that have recently been completed, projects that are underway, and targeted near-term improvements. In addition, a discussion of future improvements to achieve fast, frequent, safe and reliable rail passenger service in the Pacific Northwest Rail Corridor is presented. A major focus of this discussion is the potential impacts the program and its proposed improvements may have on surrounding communities and the natural environment.

Chapter Two
Purpose Of The Program

Traditionally, when we think of transportation improvements that connect major cities, we think of building or expanding interstate highways and airports. However, new or expanded highways and airports are expensive and extremely difficult to build. Major intercity transportation corridors are becoming increasingly congested. Existing air and highway modes are facing severe congestion.[1]

Currently, approximately seven million people live in locations within 20 miles of the Pacific Northwest Rail Corridor,[2] and the corridor population is expected to grow by more than 40% during the next 20 years.[3] This growth is projected to create a stronger economy, a 36% increase in jobs,[4] and a 75% increase in regional intercity travel.[5]

Freight and passenger rail is an important part of our state's transportation system. Moving people and goods by rail is safer and friendlier to the environment than adding traffic to our already congested highways. Improvements to the state's rail system, whether funded by the private sector or the public sector, can help mitigate the impacts of our fast growing economy and population. The purpose of WSDOT's passenger rail program is to:

- Provide a viable, cost effective travel mode that significantly increases options for intercity travel.
- Respond to the direction given in Revised Code of Washington Chapter 47.79 to develop high quality passenger rail service through the incremental upgrading of the existing service.
- Develop fast, frequent, safe and reliable Amtrak *Cascades* service that does not require an operating subsidy.
- Reduce the overall impacts of transportation improvements on local communities and the environment.
- Increase safety throughout the corridor.
- Team with our partners and customers to provide more efficient, predictable, reliable and cost effective movement of people and goods.

Why Do We Need This Plan?

This Plan provides a road map for needed improvements to our intercity rail system to meet the demands of the next 20 years, with an ultimate goal of providing hourly daylight service between Seattle/Tacoma and Portland with frequent connections to Vancouver, BC. While congestion increases on our highways, traveling between downtown Seattle and downtown Portland

[1] RCW 47.79 & High Speed Ground Transportation Study, Washington State Department of Transportation, October 1992

[2] RCW 47.79

[3] Washington State Department of Transportation. Trends Analysis Report: A Report on Trends and Our Future, April 1998.

[4] Ibid.

[5] RCW 47.79

by train will become faster, taking only about 2 ½ hours by 2018.

The efficient movement of people and goods within the region is crucial to the state's ability to compete in world markets, to protect the environment, and to maintain a high quality of life. Given the level of urbanization, increasing the capacity of the existing highway system would have significant environmental impacts and prove extremely expensive. By contrast, improving our Pacific Northwest rail system is an option for increasing capacity that could ease our region's growing pains in a cost effective manner.

This Plan identifies efforts that have recently been completed in the rail corridor and projects that are currently underway. In addition, this Plan presents improvements to the corridor that will be needed in the future so that we can increase service incrementally over the next 20 years.

Washington's Transportation Plan 1997 – 2016

Released by the Washington State Transportation Commission in April 1996, Washington's Transportation Plan presents the state's 20-year vision for state-owned transportation systems. It presents measurable service objectives and their estimated costs for each system, including intercity passenger rail.[6]

WSDOT's Amtrak *Cascades* program is designed to incrementally achieve these service objectives. WSDOT is currently updating the Washington State Transportation Plan to reflect changes in the state's transportation goals and funding sources. The new State Transportation Plan will be released by the summer of 2001.

Why Can't We Just Increase Train Speeds And Put More Trains On The Track Now?

Amtrak *Cascades* trains operate primarily on tracks owned by BNSF; they share those tracks with freight trains. With increases in passenger and freight rail service, the tracks are reaching their capacity.

Congestion is due to the increased number of trains on the track, particularly where bridges or tunnels limit the system; where freight trains are put together and/or taken apart; and where rivers, shorelines, and mountains limit train service. If more passenger trains are added to this corridor, improvements must be made to relieve or bypass these chokepoints.

In addition, maximum authorized passenger train speeds are 79 mph on most lines in the corridor. These speeds are the highest allowed by the Federal Railroad Administration's regulations for the current type of track and signal system. To increase speeds above 79 mph, improvements to the tracks and crossing signals need to be made.

It is also important, because of the increasingly diverse activities on the railroad system, to install newer, centralized control systems. These improvements, together with track improvements, will ensure the needs of the many users of BNSF's railway are met.

[6] More information about the Washington Transportation Plan service objectives for intercity passenger rail can be found on page 43 of the April 1996 Washington Transportation Plan. More detailed information is also presented in the Public Transportation and Intercity Rail Passenger Plan for Washington State, 1997 – 2016 (December 1996). Both documents can be obtained by calling the Public Transportation and Rail Division at WSDOT or they can be downloaded from www.wsdot.wa.gov.

Analysis and computer models show that, once these infrastructure improvements are in place, passenger rail service can be increased to a level that will result in up to 2.2 million passengers per year, 300 million[7] passenger miles per year, and hourly service between Seattle and Portland. The system will carry these people with no automobile emissions, improved safety, and no operating subsidy.

The corridor serves some of the world's busiest ports, including the Ports of Seattle and Tacoma.

What Else Is Going On In The Corridor?

WSDOT is committed to developing rail passenger service as part of a balanced transportation system. Efforts have been made to develop state, regional, local and private interest in the Pacific Northwest Rail Corridor. Numerous activities are currently underway in the same corridor that require extensive coordination among the various agencies and organizations.

In order to meet the program's stated goals and vision, the Amtrak *Cascades* program must recognize that the state's partners also have their goals and visions (based on their particular needs) for the same corridor, and that we plan for some of these activities.

The major programs and/or plans that will be implemented within the near future include:

- ***Expansion of Port Facilities.*** The rail corridor serves some of the world's busiest ports, including Seattle, Tacoma, Bellingham, Everett, Kelso/Longview, Kalama, and Vancouver, WA, as well as Portland and Vancouver, BC. Imports and exports include commodities, such as grain and minerals, and consumer goods, such as automobiles and electronics. As a result of growing business all of these ports are undergoing expansion and renovation. The Pacific Northwest Rail Corridor program complements the immediate and future needs of each of these ports.

- ***The BNSF Business Plan.*** The railroad is continually maintaining and upgrading the existing rail line to accommodate continued projected growth. A projection of this growth has been factored into the capacity projections developed for the Pacific Northwest Rail Corridor program.

- ***Freight Action Strategy for Seattle-Tacoma Corridor.*** WSDOT has been working with the Puget Sound Regional Council, the region's metropolitan planning organization, since 1995 to define freight mobility needs through the "Freight Action Strategy for Seattle-Tacoma" planning effort.

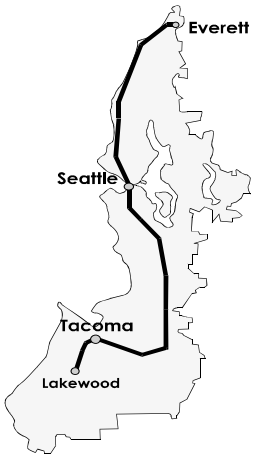
  The Freight Action Strategy for Seattle-Tacoma project is focused on north-south travel between Everett and Tacoma. The rail corridor includes both Interstate 5 and the rail main lines. The Freight Mobility Roundtable, a committee of public and private sector representatives, provides a mechanism

[7] Pacific Northwest Rail Corridor Operating Plan, Years 2003 and 2018. December 1997.

for collaboration and input into this project.

The Freight Action Strategy for Seattle-Tacoma project examined specific capital and operational improvements – such as dedicated regional freight capacity – for inclusion in the Metropolitan Transportation Plan and the Washington Transportation Plan. It has also refined a proposed program of grade separation projects for inclusion in freight mobility program proposals being developed at the state level. When monies become available these projects will be implemented.

- ***Sound Transit* Sounder *Commuter Rail Program.*** Voter-approved Sound Transit commuter rail service could be running in the Central Puget Sound area in 2000. *Sounder* trains will share tracks and some stations with the Amtrak *Cascades* service. The commuter rail service will run from Lakewood through Tacoma, north to Seattle, through Edmonds, and terminate in Everett.



Environmental review of project improvements and operations for the commuter rail segment between Seattle and Tacoma was completed in the summer of 1998. Service is scheduled to begin in Fall 2000 between these cities.

Service between Everett and Seattle and between Lakewood and Tacoma is targeted to begin in early 2001. Environmental review of these segments is nearing completion.

WSDOT is working closely with Sound Transit to ensure that environmental documents and plans are consistent. In addition, capacity analyses performed by both WSDOT and Sound Transit incorporate both programs as well as BNSF's projected freight needs.

How Will These Activities Affect WSDOT's Rail Program?

These activities will add more trains to the BNSF main line and will change facilities along the railroad tracks. WSDOT's passenger rail program recognizes that other partners have needs along the corridor. WSDOT is currently working with each of these partners to review specific improvements. WSDOT's vision as presented in the following chapter incorporates many of these activities.

Chapter Three
Washington's Vision For Amtrak *Cascades* Service

The state's vision for passenger rail in the Pacific Northwest extends over a 20-year horizon. The vision is to reduce travel times and provide more frequent, safe and reliable Amtrak *Cascades* service between Portland, OR and Vancouver, BC.

The vision will be implemented through an incremental approach. Service will be increased over time, based on market demand and available funding. In order to increase service, a number of railroad infrastructure improvements are required. Reduced travel times and more frequent passenger rail service in the Pacific Northwest Rail Corridor will require additional or improved rail geometrics, new trackage, more sidings, new passenger equipment, and more advanced signals and communications systems.

A new Amtrak Cascades *train, introduced to the Pacific Northwest Corridor in January 1999.*

These improvements are needed because the existing rail facilities cannot currently accommodate more frequent rail service or reduced travel times.

In addition, the limited capacity of the existing rail line creates conflicts between slower freight trains and higher speed passenger trains. These conflicts adversely affect passenger and freight train scheduling and reliability.

State-sponsored research indicates that, once all the infrastructure improvements are in place (for the entire 20-year program), passenger rail service can be increased to a level that will result in up to 2.2 million passengers per year, 300 million passenger miles per year, hourly service between Seattle and Portland, and service every two to four hours between Seattle and Vancouver, BC.

What Type Of Passenger Rail Service Do We Have Today?

Trains link major population centers throughout the corridor. Amtrak and the state of Washington operate intercity passenger rail service, with stations located in Portland; Vancouver, WA; Kelso/Longview; Centralia; Olympia/Lacey; Tacoma; Seattle; Edmonds; Everett; Mt. Vernon/Burlington; Bellingham; and Vancouver, BC.

All stations on the corridor are served by Washington State's Amtrak *Cascades* trains

(sometimes called corridor trains). Two Amtrak long-distance trains (sometimes called long-haul trains) also serve many of these communities. Amtrak's *Coast Starlight* travels daily between Seattle and Los Angeles via Tacoma; Olympia/Lacey; Centralia; Kelso/Longview; Vancouver, WA and Portland. The *Empire Builder* travels daily between Seattle/Portland and Chicago via Spokane.

Amtrak *Cascades* trains originate and end service within the Pacific Northwest Rail Corridor. Long-distance trains start or end outside the corridor. There is a marked difference in frequency and reliability between these two types of train service. Long-distance trains are typically less frequent – providing service once or twice a day. Their on-time performance is often less reliable because they travel longer distances and are more susceptible to delays.

Amtrak *Cascades* trains, on the other hand, can truly meet the state's goals of faster, more frequent, and reliable service.

Today, corridor trains run daily and carry 87% of passengers traveling by rail between Portland and Vancouver, BC. Long-distance trains carry 13% of all riders in the rail corridor.

Amtrak *Cascades* are sleek, European-style trains build by Talgo, Inc. especially for Pacific Northwest travelers. Amenities on the Amtrak *Cascades* include a choice of business class or coach class service; movies; music channels; a bistro (café) and lounge car; bicycle racks; fresh local foods and beverages; family and business table seating; and adjustable seats with foot rests. The Amtrak *Cascades* are among the most accessible trains in the world; they are the first trains to provide independent wheelchair accessibility between cars.

Seattle to Portland Service

Three Amtrak *Cascades* trips are available daily between Seattle and Portland: #750/755, #751/752, and #753/754. The three corridor trains offer a high degree of reliability. The other train that offers this service is Amtrak's *Coast Starlight*. The *Coast Starlight* is a long-distance train with service to Los Angeles, CA. This long-distance train can experience delays. As a result, northbound reliability (Portland to Seattle) suffers.

Seattle to Bellingham/Vancouver, BC Service

Two daily round trips connect Seattle and Bellingham: Amtrak *Cascades* #760/763 and #761/762. One of these trains (#760/763) travels north to Vancouver, BC. A connecting bus provides service between Bellingham and Vancouver, BC for train #761/762.

What Type Of Service Is WSDOT Planning?

Washington State plans to continue to incrementally improve Amtrak *Cascades* service over the next 20 years. Improvements to track, safety systems, train equipment and stations will reduce travel times, increase train frequency, and improve safety and reliability. The program first began in the early 1990s when the states of Washington and Oregon, the province of British Columbia, and other partners worked together to introduce new corridor train service between Seattle-Portland and Seattle-Vancouver, BC.

WSDOT's current plans outline rail corridor and service development through 2018. During this time railroad infrastructure and service will be incrementally upgraded based upon market demand, the availability of partnership investment, and legislative authorization.

What Impact Does Funding Have On Service Upgrades?

Amtrak *Cascades* service improvements, including train frequencies, listed in this Plan are based upon budgets and goals listed in the Washington Transportation Plan. Development of improved Amtrak *Cascades* service is dependent upon money from Washington State, Amtrak and other project partners. The level of available funding will determine if service goals are met as scheduled, delayed or accelerated.

Table 1 presents an overview of the number of round-trip passenger trains per day for current and planned service along the corridor. Table 2 summarizes travel times for this service.

Table 1
Round-Trip Corridor Trains (Per Day)*

Destination	**1993**	**1999**	**2003**	**2018**
Portland, OR to Seattle, WA	1	3	8	13
Seattle, WA to Vancouver, BC	0	2**	3	4
Vancouver, BC to Portland, OR	0	N/A	2	2-3

**Does not include the Coast Starlight.*
***Amtrak* Cascades *#761/762 travels between Seattle and Bellingham. A motorcoach connection to Vancouver, BC is provided at Bellingham.*

Table 2
Corridor Train Travel Times (Plus/Minus Ten Minutes)

Destination	**1993**	**1999**	**2003**	**2018**
Portland, OR to Seattle, WA	3:55	3:30	3:15	2:30
Seattle, WA to Vancouver, BC	N/A	3:55*	3:40	2:57
Vancouver, BC to Portland, OR	N/A	N/A	6:57	5:37

**Travel time for train #760/763.*

By The Year 2003

By the year 2003, WSDOT will have increased Amtrak *Cascades* service to 11 trains per day. Passengers in Seattle will have the option of choosing eight trains per day to Portland. Riders from Seattle (and intermediate locations) to Vancouver, BC will have three trains per day. Passengers desiring to travel from Portland (and intermediate locations) to Vancouver, BC (or vice-versa) will have the option of riding two different trains per day, eliminating the need for an overnight stay in Seattle. Train travel times will also decrease by the year 2003. Current travel times from Vancouver, BC to Seattle will decrease by approximately 15 minutes each way. Travel times from Portland to Seattle will decrease by nearly 15 minutes. The approximate travel time for passengers from Portland to Vancouver, BC will be just under seven hours.

Figures 2 and 3, on pages 12 and 13, provide more detailed service information for each station in the corridor.

By The Year 2018

By the year 2018, Amtrak *Cascades* service along the Pacific Northwest Rail Corridor will be dramatically different. Travel between Seattle and Portland will increase to 13 trains per day. Vancouver, BC to Seattle service will include four trains per day, two

of which will continue on to Portland. The estimated travel times will be 2 ½ hours for travel from Seattle to Portland; slightly less than three hours from Seattle to Vancouver, BC; and approximately 5 ½ hours from Vancouver, BC to Portland.

How Many People Will Ride The Train?

The goal of the state's rail program is to serve almost 2.2 million passengers per year by 2018. Based on current ridership and in-depth computer modeling, this projection is very realistic.

Ridership on the corridor trains has increased substantially in recent years. In 1993, when service expansion began, annual ridership on Amtrak's Seattle to Portland train was less than 95,000 per year.

Total ridership in the corridor has risen from 226,000 (1993) to approximately 565,000 (1999).[8] Table 3 illustrates current ridership in the corridor as well as five-year and 20-year projections.

However, WSDOT recognizes that market forces change over time. Consequently, if ridership goals are not met for each service level of the program, increased service may not be provided or may be deferred. On the other hand, if ridership along the corridor increases beyond WSDOT's projections, it would be possible, based upon legislative funding, to increase service in a shorter time frame. This incremental approach was designed to serve the needs of both riders and taxpayers.

Are We On Track?

The information presented in this document presents WSDOT's goals for intercity passenger rail service over the next 20 years. In order to measure its success in meeting these goals, WSDOT compares such factors as ridership and revenue, frequency of service, and travel times with the goals presented in this planning document. Updated information can be found at www.wsdot.wa.gov/pubtran or www.amtrakcascades.com.

Table 3
Pacific Northwest Rail Corridor Annual Ridership
Vancouver, BC to Portland, OR

Train Service	1993	1995	1997	1999	2003	2018
Amtrak *Cascades*	94,100	286,700	346,000	450,000	1,094,000	1,920,000
Other Amtrak Service	132,300	103,800	139,000	115,200	225,800	260,200
TOTAL	226,400	390,500	485,000	565,200	1,319,000	2,180,200

Source: Amtrak West Ridership and Revenue Summary, September 1999, the Pacific Northwest Rail Corridor Operating Plan Years 2003 and 2018 and the WSDOT Pacific Northwest Rail Corridor 1996 Ridership Comparison Sheet.

[8] Washington State Department of Transportation Rail Office, Ridership Comparison Sheet.

Vancouver, BC

Travel Time	Today	2003	2018
To Seattle	3:55	3:40	2:57
To Portland	N/A	6:57	5:37
Round Trips			
To Seattle	2	3	4-6
To Portland	N/A	2	2-3

Bellingham, WA

Travel Time	Today	2003	2018
To Seattle	2:25	2:20	1:57
To Portland	N/A	5:47	4:37
Round Trips			
To Seattle	2	3	4-6
To Portland	N/A	2	2-3

Mount Vernon/Burlington, WA

Travel Time	Today	2003	2018
To Seattle	1:55	1:50	1:30
To Vancouver, BC	1:20	1:15	1:00
Round Trips			
To Seattle	2	3	4-6
To Vancouver, BC	2	3	4-6

Everett, WA

Travel Time	Today	2003	2018
To Portland	N/A	4:23	3:25
To Vancouver, BC	3:06	3:43	2:07
Round Trips			
To Portland	N/A	2	2-3
To Vancouver, BC	2	3	4-6

Edmonds, WA

Travel Time	Today	2003	2018
To Portland	N/A	3:57	3:05
To Vancouver, BC	3:38	3:10	2:32
Round Trips			
To Portland	N/A	2	2-3
To Vancouver, BC	2	3	3-6

Seattle, WA

Travel Time	Today	2003	2018
To Portland	3:50	3:15	2:30
To Vancouver, BC	3:55	3:40	2:57
Round Trips			
To Portland	4	8	13
To Vancouver, BC	2	3	4-6

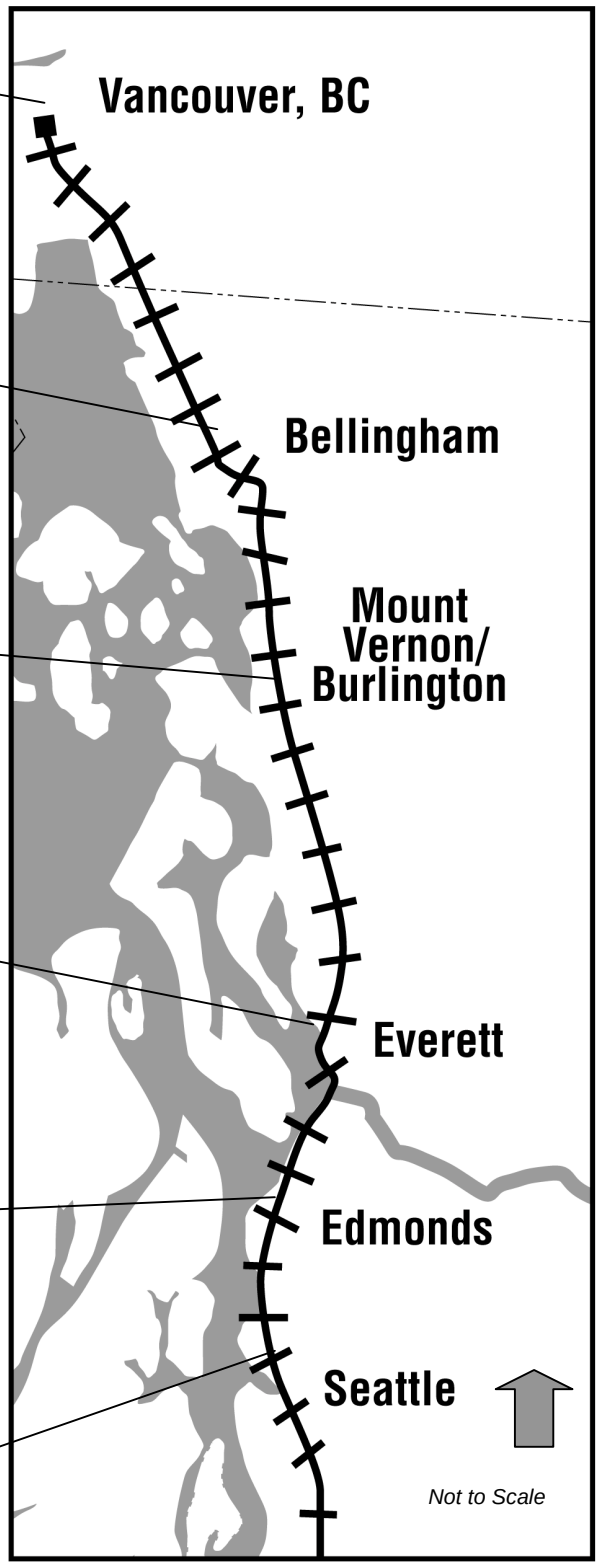
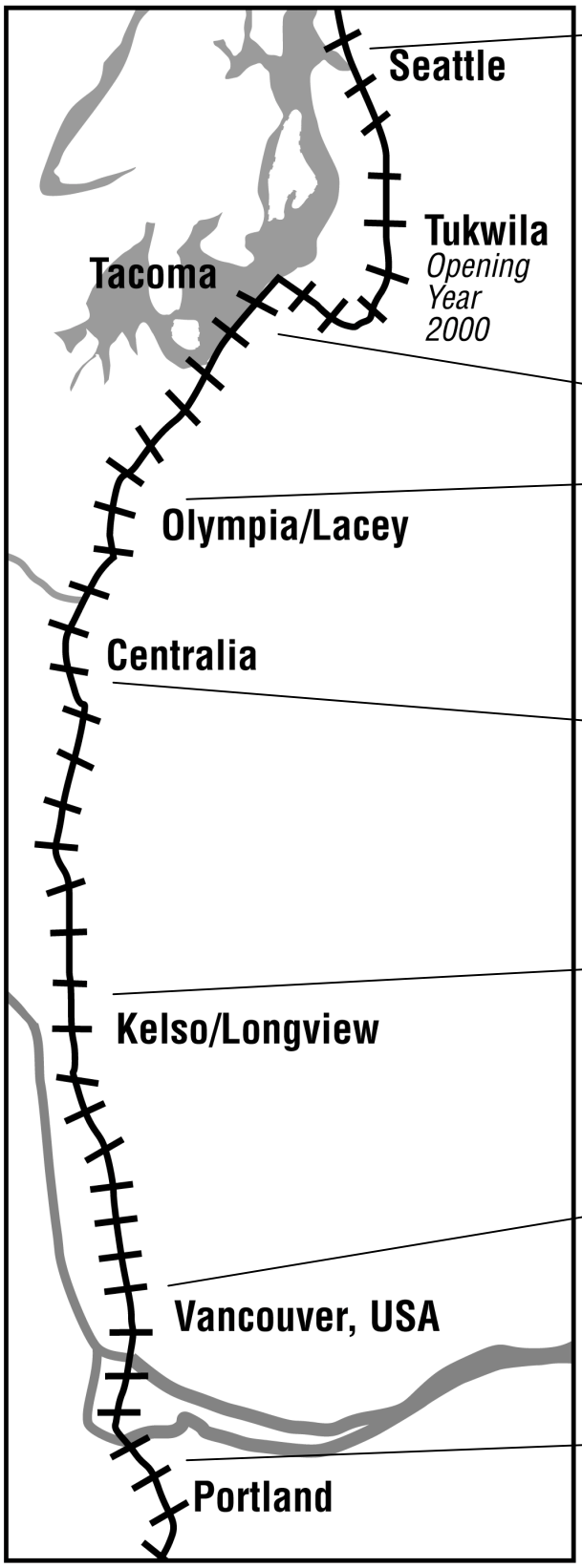


Figure 2
Current and Planned Service Along the Corridor – North of Seattle
(travel times are plus or minus ten minutes)



Seattle, WA

Travel Time	Today	2003	2018
To Portland	3:30	3:15	2:30
To Vancouver, BC	3:55	3:40	2:57
Round Trips			
To Portland	4	8	13
To Vancouver, BC	2	3	4-6

Tacoma, WA

Travel Time	Today	2003	2018
To Portland	2:40	2:37	2:01
To Vancouver, BC	N/A	4:30	3:23
Round Trips			
To Portland	4	8	13
To Vancouver, BC	N/A	2	2-3

Olympia/Lacey, WA

Travel Time	Today	2003	2018
To Portland	2:06	2:01	1:32
To Vancouver, BC	1:24	1:15	0:57
Round Trips			
To Portland	4	8	13
To Vancouver, BC	4	8	13

Centralia, WA

Travel Time	Today	2003	2018
To Portland	1:46	1:34	1:12
To Seattle	1:44	1:42	1:18
Round Trips			
To Portland	4	8	13
To Seattle	4	8	13

Kelso/Longview, WA

Travel Time	Today	2003	2018
To Portland	1:09	0:57	0:43
To Seattle	2:21	2:21	1:47
Round Trips			
To Portland	4	8	13
To Seattle	4	8	13

Vancouver, WA

Travel Time	Today	2003	2018
To Seattle	2:55	2:46	2:14
To Vancouver, BC	N/A	6:46	5:21
Round Trips			
To Seattle	4	8	13
To Vancouver, BC	N/A	2	2-3

Portland, OR

Travel Time	Today	2003	2018
To Vancouver, BC	N/A	6:46	5:21
To Seattle	3:30	3:15	2:30
Round Trips			
To Vancouver, BC	N/A	2	2-3
To Seattle	4	8	13

Figure 3
Current and Planned Service Along the Corridor – South of Seattle
(travel times are plus or minus ten minutes)

Chapter Four
Amtrak *Cascades* Program Components

During the 1993 session, the Washington State Legislature directed WSDOT to develop high speed ground transportation services within the state. It also called for the development of high-quality intercity passenger service through the incremental upgrading of existing Amtrak service. WSDOT was directed to develop a prioritized list of infrastructure projects that would improve existing service and enable WSDOT to fulfill the legislature's directive to provide safe, faster, more frequent and more reliable passenger rail service through an incremental approach.

To date, this incremental approach has included analysis of the entire corridor system, including the operation of freight rail, commuter rail, and intercity passenger rail. Improvements identified by WSDOT and our partners include:

- Upgrading grade crossings;
- Increasing speeds to improve corridor capacity and travel times;
- Enhancing train control signals to improve corridor capacity, increase train speeds, and enhance safety;
- Upgrading tracks and facilities to relieve congestion, improve ride quality and safety, increase train speeds, and improve corridor capacity;
- Purchasing new passenger train equipment to operate along the corridor to increase frequencies and using tilt technology to decrease travel time; and
- Improving stations and their ability to serve neighboring communities and to provide connections to other modes of travel.

This chapter discusses these types of improvements and their relationship to the passenger rail program. Once improvement types and locations are finalized, WSDOT will work with our partners to allocate costs for each improvement.

Grade Crossing Upgrades

Grade crossings are designated places where cars, trucks, buses, bicyclists, and pedestrians cross the railroad tracks. At-grade crossings are locations where the roadway and the tracks cross each other at the same elevation. At grade-separated crossings, the roadway goes over the railroad tracks or the tracks go under the roadway. Most crossings along the corridor are at-grade.

Depending upon the speed of the train and the amount of vehicular traffic that crosses the tracks, federal guidelines recommend certain types of warnings at the crossings.

Types Of Grade Crossing Warning Signs

Upgrading crossings can help improve safety, increase train speeds, and reduce local traffic congestion. Warning devices are designed on a site-specific basis, taking into account rail traffic, vehicular traffic, and accident history, among other factors.

Warning devices can range from simple markings on the roadway alerting drivers and pedestrians of railroad tracks, to

complete grade separation. Grade-separated crossings are expensive and often not warranted for low volume and low speed intersections. All grade crossings have some form of warning, from signs to active warning devices that include flashing lights and gates. Active warning is used at virtually all grade crossings in urban areas. New technologies, beyond signals and gates, are being developed and tested that enhance safety but do not require grade separations. As these new technologies are tested and approved, safety guidelines may be revised to include them.

Safety improvements at grade crossings are being made along the corridor. As discussed in Chapter Two of this Plan, other non-related programs are addressing grade crossings along the corridor. The Freight Action Strategy for Seattle-Tacoma corridor program has targeted a number of grade crossings for closure or separation. Through these and other programs, including the Pacific Northwest Rail Corridor program, WSDOT is working with communities and the BNSF to identify grade crossings that may need enhanced warning signals, grade separation or other treatments to enhance safety.

Speed Increases

Higher speeds reduce travel times, resulting in better passenger and freight service. Speeds are limited by safety requirements, by the train signaling system, and by track design. Trains typically cannot go fast around sharp curves or up steep grades.

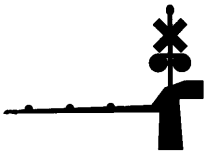
A number of agencies have the authority to set speed restrictions. In general, under the authority of Revised Code of Washington 81.48.030, the Washington Utilities and Transportation Commission has the authority to set speed limits at all grade crossings in unincorporated areas and in all

ADVANCE WARNING SIGNS: Means a roadway-rail grade crossing is ahead.

PAVEMENT MARKINGS: Painted on the pavement in front of a crossing.

RAILROAD CROSSBUCK SIGNS: Found at all public crossings. Should be treated as yield signs.

FLASHING LIGHT SIGNALS: Used with crossbuck signs and roadway-railroad crossings. You must always stop when the lights are flashing.



GATES: Used with flashing signals at certain crossings to indicate that a train is coming.

Figure 4
Types of Railroad Grade Crossing Warning Signs

cities (except first class cities like Seattle or Tacoma). However, federal regulations preempt the state from setting speed limits except where unique local safety conditions exist. As a result, the Utilities and Transportation Commission can set speed limits only where such conditions warrant a deviation from Federal Railroad Administration track safety standards. The Federal Railroad Administration has general design guidelines for grade crossings, depending upon the speed of the train and the type of track.

BNSF and Amtrak are working with local jurisdictions and the Utilities and Transportation Commission to increase freight and passenger speeds to keep trains running on schedule in the corridor.

Proposed freight speed increases range from five to 15 mph, with some up to 30 mph. Maximum speeds set by the Federal Railroad Administration for the current type of track and signal system along the corridor are 79 mph for passenger and 60 mph for freight service. As part of its guidelines the Federal Railroad Administration has recommended specific grade crossing treatments. These treatments range from gates and lights at a railroad crossing to complete grade separation. Table 4 outlines gate and signal guidelines and Figure 5 illustrates the differences between two-quadrant warning and four quadrant warning gates.

Table 4
Federal Railroad Administration's Guidelines for Grade Crossing Treatment

0-79 mph	Gates and signals are desired in two quadrants.
80-90 mph	Gates and signals are required in two quadrants.
91-110 mph	Gates and signals are required in four quadrants.
111+ mph	Grade separation is required.

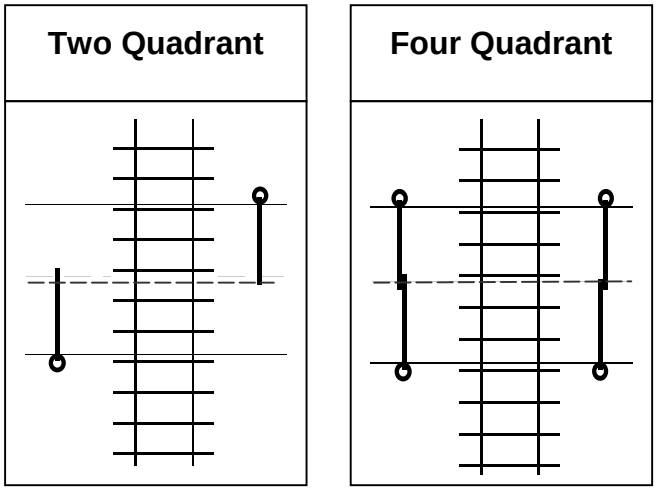


Figure 5
Illustration of Two or Four Quadrant Gates at Railroad Crossings

To ensure safe passage across the tracks, WSDOT will continue to work with communities to enhance, consolidate or close designated crossings for pedestrians and automobiles and to educate them about the necessity to heed the warning devices and not to go around or ignore flashing lights. Since virtually all railroad corridors are actually private right-of-way, crossing them at other than designated public crossings is not only dangerous, it is also considered trespassing.

Enhanced Train Signals And Communication

Enhancements to the existing signal and communication systems along the rail line are crucial for the development of better passenger service in the corridor.

Signal and communication systems, such as Centralized Traffic Control, route and monitor the location and direction of trains on the tracks. Upgrading these systems can help improve safety, increase the number of trains that can simultaneously use the rail system, and reduce the time it takes to get from one place to another.

During 1997 BNSF and the Union Pacific Railroad tested a new system along the corridor. This new system, known as positive train separation, utilizes global positioning satellites to continuously monitor train locations.

Improved signal and communications along the rail corridor will allow Amtrak, Sound Transit and BNSF to run more trains safely and efficiently.

Improved Tracks And Facilities

The WSDOT passenger rail program's incremental approach not only allows service to be introduced over an extended period of time, it also allows infrastructure improvements to be built over time. WSDOT and our partners have developed an approach that begins with the design and construction of lower-cost infrastructure improvements along the corridor.

These improvements are for the whole system and are designed to relieve obvious bottlenecks, increase reliability, and improve safety. Later projects, to be introduced after the year 2005, are designed to increase capacity and speeds, allowing passenger trains to arrive and depart almost hourly.

The following discussion presents the types of infrastructure improvements that will be necessary over the next 20 years to meet the state's service goals. Projects that are currently at the design stage, scheduled for implementation between the years 2002-2005, are also discussed.

Sidings and Siding Extensions

Siding tracks are secondary tracks parallel to the main line. Sidings are used to let trains on the same track pass each other - one train will switch off the main line and wait on the siding track while the other passes on the main line track.

Sidings provide areas for trains to pass each other. They increase the capacity of the tracks.

As rail corridors become increasingly congested, extensions to existing sidings and new sidings are required. Sidings provide more areas for trains to pass each other, resulting in increased capacity along the corridor.

Two projects currently under design for new sidings and/or siding extensions are located in Centralia and Bellingham. These projects are discussed in greater detail in the section entitled "Potential Improvements." It is anticipated that many of the other project improvements that will be designed and constructed over the full 20-year program will include new sidings and siding extensions.

Rail Storage and Maintenance Facilities

Rail storage and maintenance facilities, or rail yards, are used to store, maintain and sort rail cars before they are loaded, unloaded or connected together into trainsets. Efficient rail yard activities are essential for the successful operation of both freight and passenger rail.

Additional yard improvements are necessary as rail corridor traffic increases. More rail traffic requires larger and more efficient yard operations. Projects may consist of providing more storage tracks, larger maintenance facilities, different layouts of storage and running tracks, or additional running tracks to get trains through or around a yard.

Improvements to Vancouver Yard (WA) are included in service level one construction projects for the Pacific Northwest Rail Corridor. This project is discussed in greater detail in the section entitled "Potential Improvements." It is anticipated that some of the other project improvements will be designed and constructed as part of the 20-year program. This may include rail yard expansions as well as the siting of a new rail yard.

Additional Main Line Tracks

This type of project would add another main line track alongside the existing track(s). The new main line may be a high speed, passenger only track, or it may be a combined freight and passenger track.

Additional main lines are required in rail corridors when traffic congestion is significant. Additional tracks provide increased capacity just as additional traffic lanes provide increased capacity on highways.

As part of service level one improvements for the rail corridor, the Kelso to Martin Bluff project entails the design and construction of a new third main line track. This project is discussed in the section entitled "Potential Improvements." It is anticipated that other third main line tracks will be needed to implement the full 20-year program. As the program moves forward, these projects will be identified and analyzed as part of the state's environmental review process.

Crossovers and Turnouts

A turnout is a track configuration that allows a train to move from one track onto another track. Turnouts consist of a switch and a layout of track and ties. Turnouts can vary in operation and configuration. There are power operated turnouts with switches that can be activated remotely, and manual turnouts with switches that can only be thrown (operated) manually.

Crossovers consist of back-to-back turnouts between two tracks. They allow a train to cross or move from one track to another. A train will switch off of one track and then turn onto the adjacent parallel track.

Crossovers and turnouts are fairly small projects and are done regularly by BNSF as part of its maintenance and upgrade program. As part of the five-year projects and the full 20-year program, crossovers and turnouts will be placed along the corridor as needed. These are the least disruptive and least costly types of improvements that will be added along the corridor.

Main Line Relocation

Main line relocations occur when a track is shifted from its current location. This type of improvement may be required when a

new track needs to be added within the existing right-of-way. Often, moving the main line makes more space available to add another track or siding, or it reduces sharp curves.

It is anticipated that there will be locations along the corridor where the main line will be relocated. In Bellingham, a portion of the main line will be relocated as part of the five-year program. Future main line relocation projects will be identified and analyzed as part of the state's environmental review process.

Bypass Tracks

A bypass track is a track that goes around other railroad facilities. It is really a siding or new mainline. It may be as simple as a track that bypasses a small yard or as significant as a complete route revision. Bypass tracks are needed, in certain instances, to provide better passenger service without impacting existing freight service.

Currently, the Pacific Northwest Rail Corridor program includes two bypass projects. The first is located at the Vancouver Yard in southern Clark County. This bypass is being designed to allow trains to pass by existing rail yard operations. The Lakeview bypass avoids congestion through Point Defiance in Tacoma by routing passenger trains through Lakewood, parallel to Interstate 5. Because of the many curves, sensitive shorelines, and single-track tunnels on the existing rail line, it would be difficult to add more trains to the route. This bypass would enable the state to move more passenger trains between Seattle and Portland by separating freight and passenger traffic in the Tacoma area.

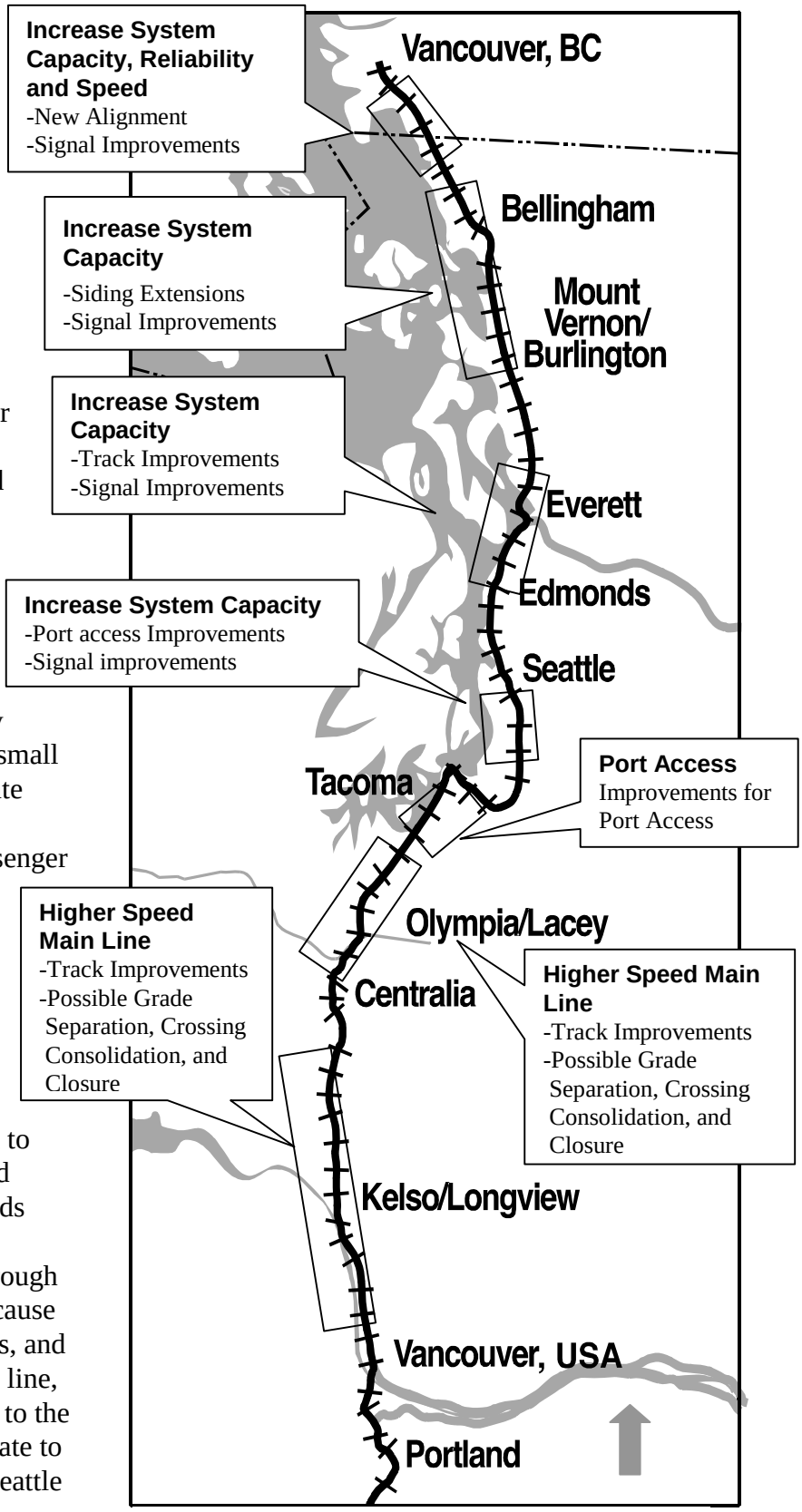


Figure 6.
Potential Troublespots and Future Possible Solutions

Utility Relocation

Significant utility relocations may be required for the construction of the program's infrastructure projects. Utilities are located throughout the corridor. Some utilities, such as fiber optics, parallel the BNSF right-of-way while many others cross under or over the railroad tracks.

Utilities will be routinely identified as part of the design and environmental review process. A determination will then be made as to whether or not the specific utilities will need to be relocated or may remain in place. Depending on easements, rights-of-way and agreements, utility relocations may be done by the utility company, WSDOT, BNSF, or some combination of all three.

Potential Improvements

WSDOT and our partners have identified areas along the corridor that may need track and facility improvements. Figure 6, on the previous page, identifies these areas and potential solutions. Due to changing freight demand, it is virtually impossible to project exactly where and what types of improvements will be needed in the future. As the program moves forward, solutions will be developed and implemented over the next 20 years.

Service Level One (Five Year) Projects

As part of our near-term service goals, WSDOT has begun to identify specific projects for design and construction within the next five years. More information about these projects will be contained in the NEPA/SEPA

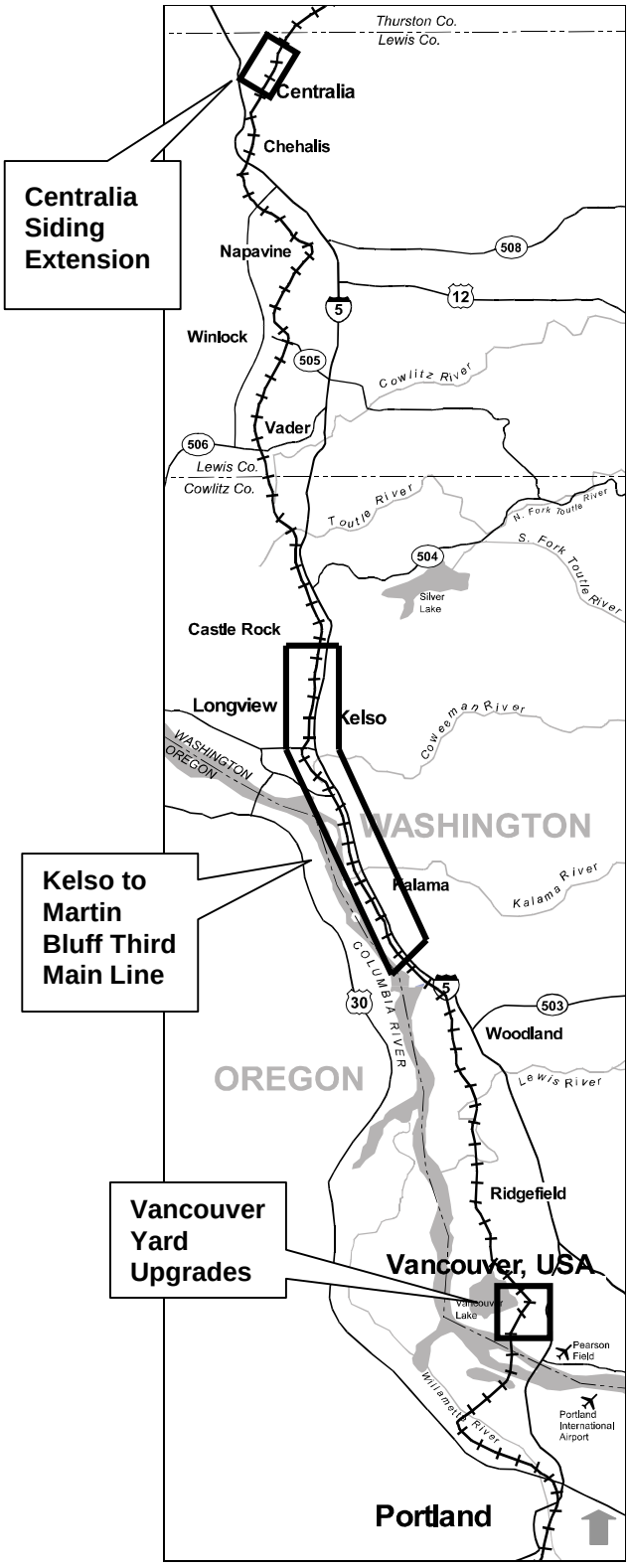


Figure 7
Service Level One Projects in Southwest Washington

environmental review documents being prepared by WSDOT. The environmental documentation will be released in mid-2000. Financing these projects and determining who will pay for them will be negotiated during 2000. Following implementation of these projects and increased Amtrak *Cascades* service, WSDOT will continuously work with our partners to identify projects and cost allocation until project build-out in 2018.

Vancouver Yard Upgrades

This project consists of a double-track bypass of the Vancouver Yard, a siding extension, and associated turnouts from milepost 132.6 to mile post 136.5. The bypass will separate grain freight traffic from passenger traffic to allow for projected increased traffic in both. It will also relieve congestion for freight coming from eastern Washington.

Kelso to Martin Bluff Third Main Line

This project consists of adding a third main line track from mile post 96.3 to mile post 113.2. Included in this project is the extension of the Kalama freight running track by approximately 4,000 feet to the south. The third main line will separate passenger traffic from freight traffic allowing an increase in the number of passenger trains. Freight access to the Port of Kalama will be improved with the extension of the freight running track.

Centralia Siding Extension

The existing siding in Centralia extends along the east side of the track, ending at mile post 52.3. The siding will be extended 2,300 feet to the north connecting it with the Steam Plant spur at mile post 51.86. This project will increase capacity on the main line by removing the connection to the Steam Plant spur from the main line and moving it to the extended siding.

Point Defiance (Lakeview) Bypass

Located in Pierce County, this bypass will allow faster-moving passenger trains to bypass the curvy tracks and single track tunnels along Point Defiance. Freight trains will continue to use the existing track around Point Defiance. This project will realign approximately two miles of single track for passenger service between mile post 9.8 on the Lakeview Branch and main line mile post 24.4.

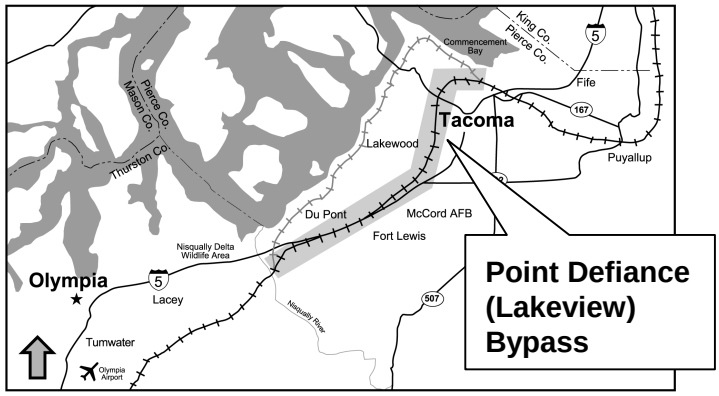


Figure 8
Service Level One Project in South Sound Area

A new single passenger track will also be installed between mile post 0.0 and mile post 9.8 on the Lakeview Branch. The new track will have associated crossovers, locks, turnouts and signaling. The purpose of this bypass is to separate passenger rail from freight rail. This bypass will serve passenger trains and allow them to travel at higher speeds, thus decreasing travel times along the corridor.

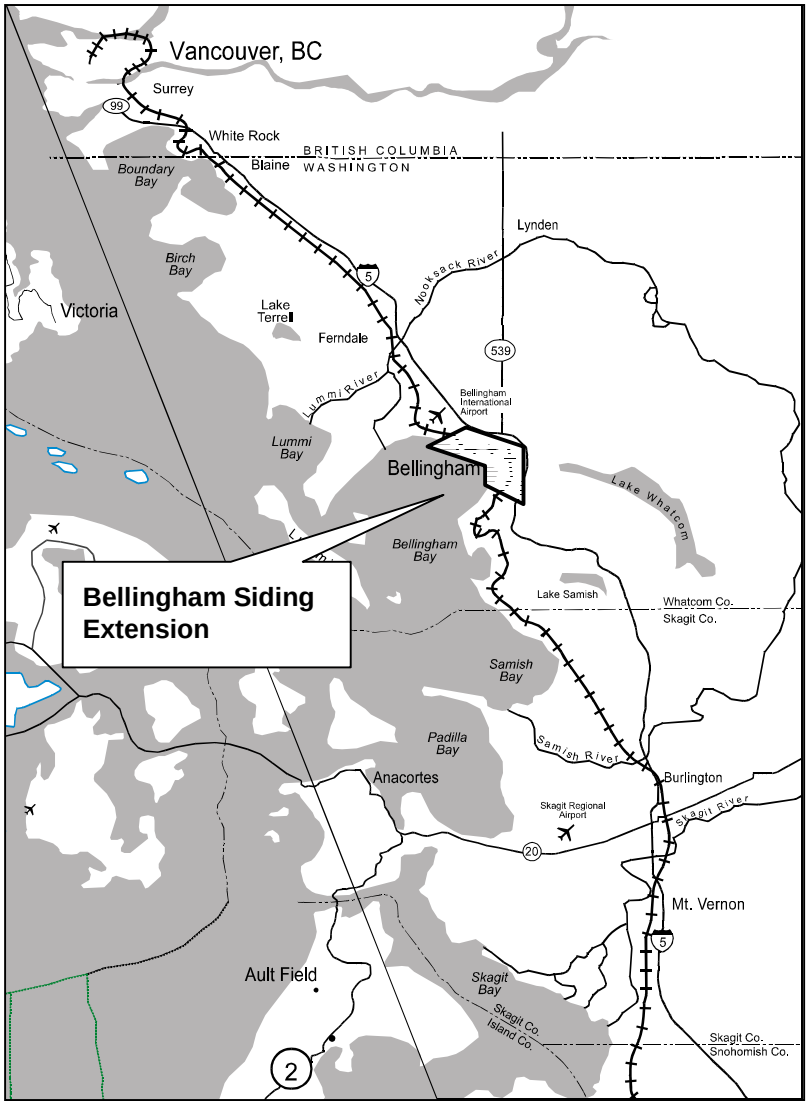


Figure 9
Service Level One Project in Northwest Washington

Bellingham Siding Extension

This project consists of extending the existing siding beyond the steep grade to the north. Completion of this infrastructure improvement will result in increased capacity and train reliability (see Figure 9).

What Projects Will Be Undertaken By Our Partners?

As part of our ongoing partnership, a number of projects that will benefit Amtrak *Cascades* service will be implemented by Sound Transit, Amtrak and BNSF over the next few years. These projects are as follows:

- Tacoma to Lakewood Double Tracking
- Glacier Park to Kent, Additional Trackage and Rail Rehabilitation
- Interbay Double Tracking
- Ballard Double Tracking
- Edmonds Double Tracking
- Mukilteo Double Tracking
- English Siding Extension in Snohomish County
- Stanwood Siding Extension
- Mt. Vernon Siding Extension
- Custer Siding Extension
- Bellingham Main Line Relocation

WSDOT has participated in reviewing the environmental documentation and engineering design of these projects.

European-Style Trains

In January 1999, WSDOT and Amtrak introduced Amtrak *Cascades* trains in the Pacific Northwest. These trains, the first owned by the state, offer added comfort and speed to corridor service.

Amtrak *Cascades* trainsets are designed for passengers traveling on Amtrak in Oregon, Washington, and British Columbia. The

new trains replaced existing equipment on daily Seattle-Portland, Vancouver, BC-Seattle, Bellingham-Seattle, and Eugene-Seattle Amtrak service.

Speed

Amtrak *Cascades* trains use passive tilt technology (the Talgo Pendular system). Consequently, they can run at higher speeds than conventional trains on existing tracks. The tilt system has air springs in the main suspension that allows the train to tilt naturally. The train tilts towards the curve without stressing the passenger. The system is considered passive because motors do not operate it; the passive tilt system functions with no energy consumption and requires no maintenance. Because of this design, sharp curves on the corridor will not have to be eliminated, thus resulting in fewer costly construction projects.

Although these new trains are capable of traveling at speeds exceeding 125 mph, they currently must travel at a maximum speed of 79 mph in our region until additional improvements to tracks, crossings, and safety systems are completed.

Trainsets

Amtrak *Cascades* trains typically include one baggage car; standard coaches with 36 seats each; one accessible coach with 19 seats that complies with the American with Disabilities Act (ADA); one bistro (cafe) car; one lounge car; one business class coach with 26 seats; one ADA-accessible business class coach with 18 seats. Each car is approximately 44 feet long, about half as long as standard Amtrak coaches.

The number of coaches in each train can vary by route and schedule, based upon customer demand. Amtrak *Cascades* train capacity currently varies from just over 100 passengers to nearly 300 passengers.

On-board safety features include clearly marked, removable emergency windows, emergency lights, first aid kits and fire extinguishers. The new trains meet Environmental Protection Agency standards for air conditioning refrigerants, federal Food and Drug Administration standards for food service, and ADA accessibility standards.

Washington State and Talgo conducted public involvement to obtain input from the physically-challenged community to ensure that Amtrak *Cascades* trainsets serve the full public. The Amtrak *Cascades* trains are among the most accessible in the world and are the first to provide independent wheelchair accessibility between cars.

Stations Serving Neighboring Communities

Throughout the corridor, intercity passenger rail stations (Amtrak stations) have been undergoing expansion and renovation. Since the early 1990s, WSDOT has been working with local communities to upgrade existing passenger rail stations throughout the state. The state of Oregon has also been working with local cities to upgrade their facilities.

Between Portland and Vancouver, BC there are currently 12 Amtrak stations (ten in Washington, one in Oregon, and one in British Columbia). The condition, size, and amenities of the stations vary widely.

However, the most important factor for all of these stations is their ability to serve future passengers. As WSDOT implements its program, each station will need to be revisited to ensure that the existing roadway

system surrounding the station can accommodate more vehicles and buses. In addition, walkways and bicycle paths should be added to a number of these stations, and additional bicycle racks should also be added at each station. Other factors that will need to be revisited include the amount of parking available and the station's ability to accommodate more passengers. As each station is upgraded, independent design and environmental analyses will be performed.

In 2000, new self-service ticketing machines will be installed at six Amtrak stations along the Pacific Northwest Rail Corridor. These devices-which are similar to ATM machines-allow customers to obtain printed tickets without going to the ticket counter. Customers with credit cards can initiate their own reservation through the machine, or simply enter in a reservation number obtained from www.Amtrak.com or 1-800-USA-Rail. The locations are Portland, Kelso/Longview, Olympia/Lacey, Tacoma, Seattle (2 machines), and Bellingham.

Sound Transit is implementing its *Sounder* Commuter Rail program between Lakewood and Tacoma. *Sounder* trains will share stations with Amtrak *Cascades* trains in Everett, Edmonds, Seattle, Tukwila, and Tacoma. It is anticipated that this new commuter service will bring impacts to station areas that will far exceed any impacts resulting from intercity passenger rail. Separate environmental documents are currently being produced by Sound Transit regarding these station area impacts.

The following presents an overview of each of the Amtrak stations between Portland and Vancouver, BC.

Union Station (Portland, OR)

Union Station was built in 1896 and has been in continuous operation. The station is located at 800 NW 6th Avenue in downtown Portland. This station serves Amtrak long-distance and intercity trains. In 1987, the Portland Development Commission acquired the station. It is the current owner of the station and Amtrak is its tenant.

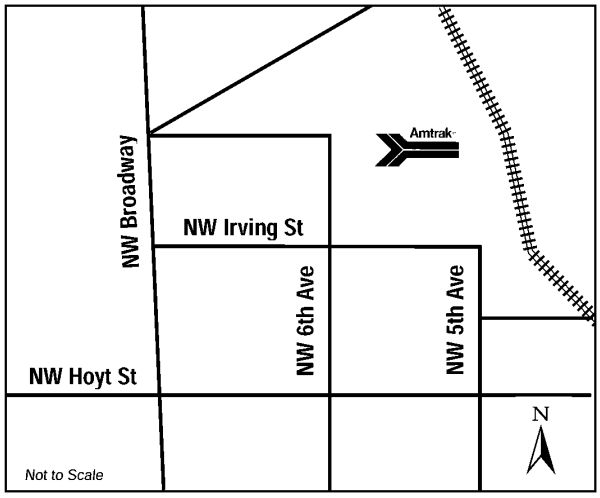


Figure 10
Portland: Union Station Vicinity Map

Union Station is a large, historic station. Since 1987 it has undergone substantial renovation. It is wheelchair accessible and is in compliance with the ADA, as required by the federal government. There is a ticket office in the station with ticket agents on duty between 7:45 a.m. and 9:00 p.m. every day. General station amenities include restrooms, telephones, a coffee shop, and a Metropolitan Lounge for first class customers.

Greyhound Bus Lines and a Tri-Met (the city's transit provider) layover bus facility are located one block from the station, providing both intercity and local transportation connections. Fourteen Tri-Met bus routes serve Union Station.

Burnside Avenue, a major east-west arterial, is just south of the station. Union Station is easily accessible by auto, bicycle and on foot. Bicycle racks are located at the station. In addition, there are two City Center Parking lots with approximately 200 public spaces and 75 tenant spaces located at the station.

Vancouver, WA

The station in Vancouver was constructed in 1908, expanded in 1917, and partially renovated in 1988. The station is located at 1301 West 11th Street. The station is owned

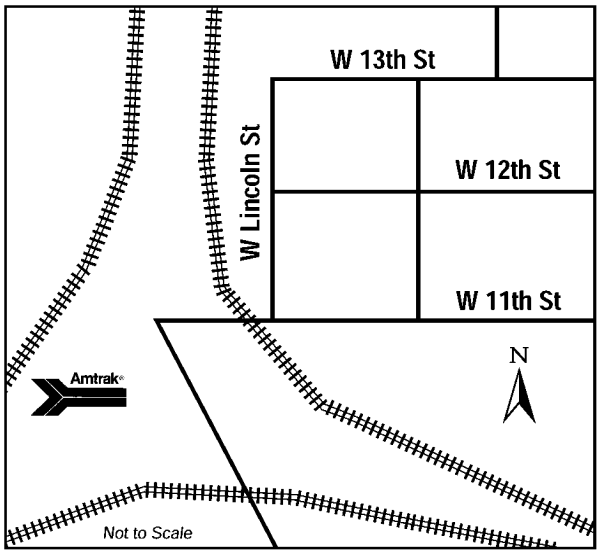


Figure 11
Vancouver, WA: Train Station Vicinity Map

by BNSF. Recent limited improvements, such as landscaping, parking, and building renovations, have been completed through funds from WSDOT and the City of Vancouver. In the summer of 1999, the City of Vancouver began the process to acquire the building and is seeking money to complete the rehabilitation of the station.

The Vancouver station is fairly small, approximately 2,000 square feet. The station is wheelchair accessible and is in compliance with the ADA. The Amtrak ticket office is open daily from 7:30 a.m. to 8:15 p.m. General station amenities include restrooms, telephones, and vending machines.

C-TRAN, the transit provider for Clark County, provides a van to meet and drop off passengers. This van takes riders to the main bus terminal to catch local bus connections. Greyhound Bus Lines is located approximately one-half mile away and can be reached by using an on-call taxi service. There are approximately 40 parking stalls that provide both free short-term and overnight parking at the station.

Kelso Multimodal Transportation Center (Kelso/Longview, WA)

The Kelso Multimodal Transportation Center, which completed construction of its award-winning design in 1995, is a renovation and addition to the old depot that was built in 1912. Local, state and federal funding was used for design and construction of improvements to the building and site. The station, located at 501 South First Avenue in Kelso, is owned and operated by the city of Kelso.

The Kelso station is approximately 5,000 square feet. It is wheelchair accessible and is in compliance with ADA. A ticket agent is available for Greyhound service; however, passengers for Amtrak are required to purchase tickets by mail or make reservations and then purchase tickets after they board their train. General station amenities include restrooms, telephones, conference rooms, and a passenger waiting area.

The Community Urban Bus System (CUBS) serves the Kelso station with Routes 20 and 21 that run along Pacific Avenue. First

Avenue, Ash, and Maple Streets provide principal access to the site. Pacific Avenue

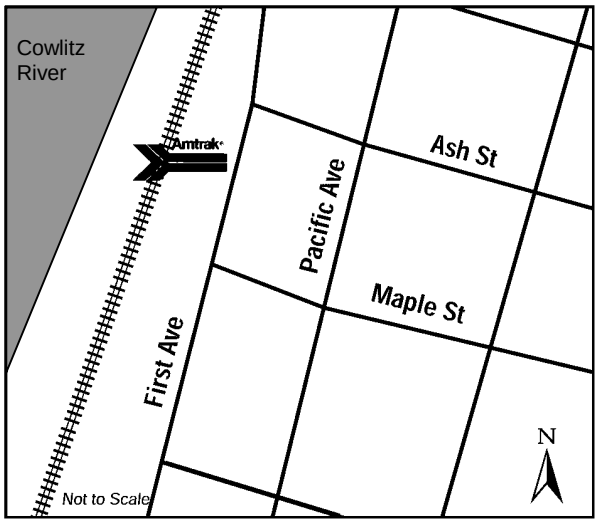


Figure 12
Kelso: Multimodal Transportation Center Vicinity Map

is the main north-south arterial serving the station. The Kelso station is easily accessible by auto, bicycle and on foot. Bicycle racks and lockers are located at the station. In addition, there are approximately 100 free short-term and overnight parking stalls.

Union Depot (Centralia, WA)

The existing BNSF depot is located approximately one block from downtown

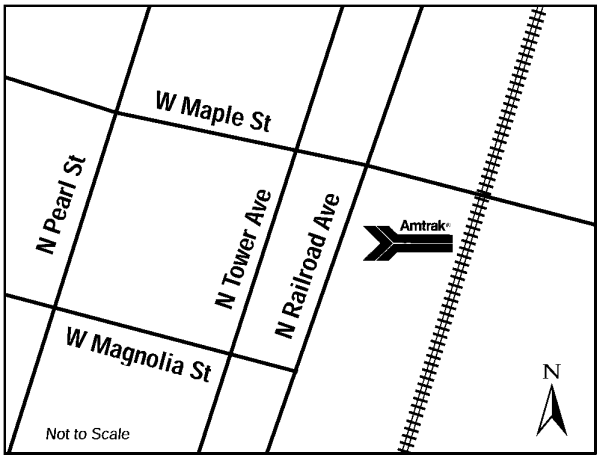


Figure 13
Centralia: Union Depot Vicinity Map

Centralia at 210 Railroad Avenue. Renovation of the station began in the mid-1990s. Recently completed renovations include resurfaced floors in the waiting area, new restroom lighting, restrooms that are ADA accessible, as well as drainage, landscaping and lighting improvements. In addition, the western passenger platform was rebuilt to a raised platform, providing increased passenger safety and the convenience of shorter stop times. These improvements complement previously completed efforts to restore the outside walls and roof of the building and to redevelop parking. The city has secured federal funding to begin the next phase of renovation, which includes developing the upstairs level into office and community space and converting former freight buildings into meeting rooms.

The station is owned and operated by the city. It has the potential of serving as an intermodal facility for trains, transit, and taxi connections.

General access to Centralia station is wheelchair accessible; however, access to restrooms is not in compliance with ADA. General station amenities include a tourist information office, waiting area, restrooms, and a telephone.

Twin Transit and Destination Centralia serve the station, providing access to downtown and local shopping malls. The station is easily accessible by auto, bicycle and on foot. There is a free short-term and overnight parking facility, with approximately 50 stalls.

Centennial Station (Olympia/Lacey, WA)

The Olympia rail depot, located at 6600 Yelm Highway SE, is a new station that was

constructed and opened for service in 1992. The station is popular and local advocates are seeking funds to purchase land for platform and parking lot expansion. The station is owned by Intercity Transit.

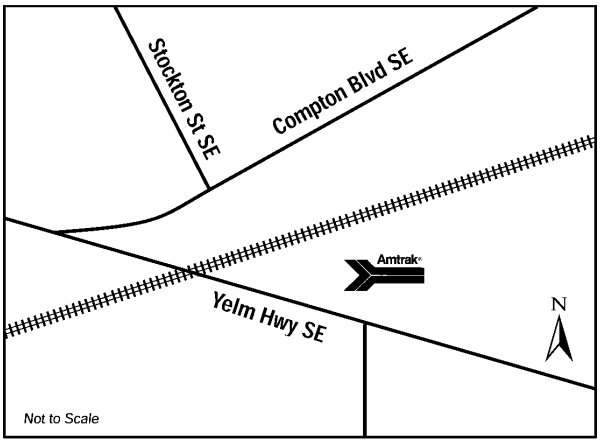


Figure 14
Olympia/Lacey: Centennial Station Vicinity Map

The station is wheelchair accessible and is in compliance with ADA. Volunteers generally are available between 8:30 a.m. and noon and 4:30 p.m. and 7:45 p.m.; they staff an information office in the station seven days a week. Tickets are not available for purchase at the station; they must be purchased in advance or onboard the train. General station amenities include restrooms, telephones, and vending machines.

Intercity Transit provides limited local transit connections between the station and the cities of Olympia and Lacey. Greyhound Bus Lines is located in Olympia, approximately six miles from Centennial Station. The station is not easily accessible by bicycle or on foot because of the remoteness of the site. There are 36 parking stalls and parking is free. The station also is served by Red Top Taxi and Capital City Taxi.

Tacoma, WA

The existing depot, located at 1001 Puyallup Avenue, was constructed in 1984 and is owned by BNSF. It was constructed to replace the deteriorated Tacoma Terminal building.

The Tacoma station is wheelchair accessible and is in compliance with ADA. There is a ticket office in the station with ticket agents on duty between 7:45 a.m. and 9:30 p.m. every day. General station amenities include restrooms, vending machines, telephones, and a waiting area.

A Northwest Trailways pick-up point is located at the station. Pierce Transit provides local transportation connections to routes 41, 400 and 500. The bus stop is located at the Amtrak station. The station is easily accessible by bicycle and on foot. Two parking lots provide free parking with approximately 80 stalls. The station also is served by Yellow Cab.

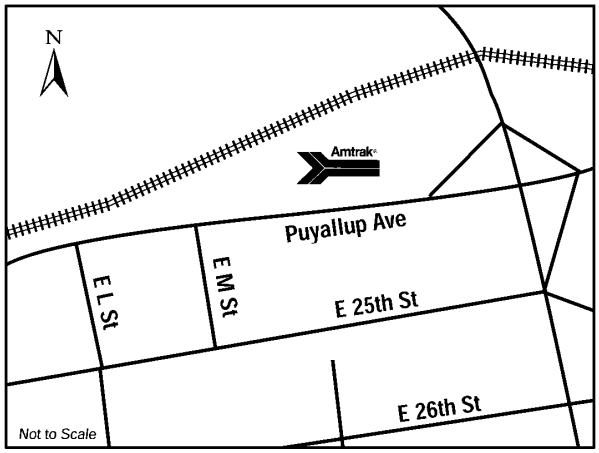


Figure 15
Tacoma: Train Station Vicinity Map

A new commuter rail and transit facility near Freighthouse Square will be completed in 2000. The Tacoma Dome Station is located on a 4.5 acre site between Puyallup Avenue and East 25th Street and East D and East E

Streets. It is owned and operated by Pierce Transit. The station includes a 2,000 stall parking structure (which opened in fall 1997) and transit loading area. The station will accommodate future Sound Transit commuter rail and light rail service. Amtrak has not yet committed to moving existing intercity passenger rail operations to this facility. A change in the current rail alignment south of Tacoma would be necessary to utilize this station.

Tukwila Station

Amtrak plans to share Sound Transit's new commuter rail station in the City of Tukwila

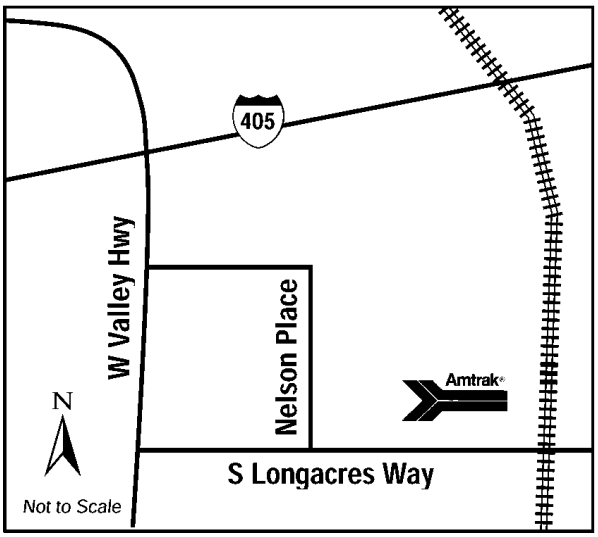


Figure 16
Tukwila: Train Station Vicinity Map

in 2000. This facility will enable Amtrak to better serve the suburban areas of south and east King County and facilitate quick transfers to Sea-Tac Airport. In early 1998, the City of Tukwila issued City Resolution 1396 in support of Amtrak's plans.

The station will be located at Longacres Way and I-405. The station will have two 1000-foot platforms with pedestrian access via a grade-separated underpass at Longacres Way. The station will have parking for 720 vehicles.

King Street Station (Seattle, WA)

King Street Station, located at 303 South Jackson Street, was built in 1906. The station is listed on the National Register of Historic Places and is also part of the Pioneer Square-Skid Road Historic District. The interior of the station was remodeled in 1950 and 1964. BNSF Railway is the current owner of the station.

Once renovations are completed, King Street Station will serve Amtrak corridor and long-distance trains, with adjacent platforms serving Sound Transit commuter rail service.

A WSDOT project team is currently completing technical evaluations of the station's interior and exterior, finalizing pedestrian and transit access plans, and determining the design of the historic rehabilitation project. Construction to redevelop King Street Station into a modern transportation hub could begin as early as the summer of 2000.

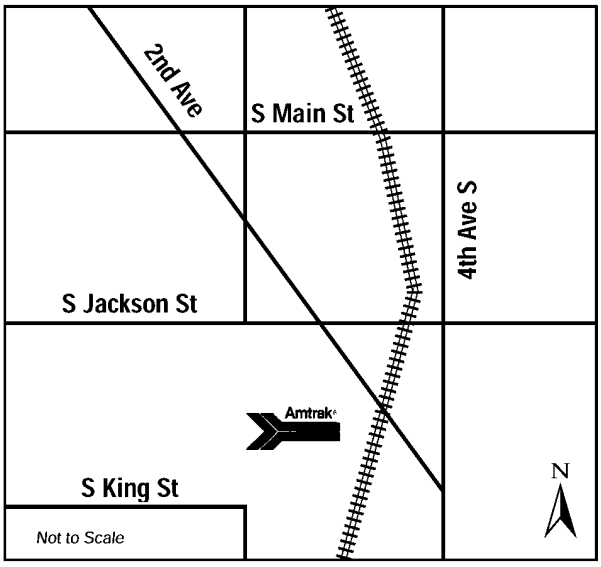


Figure 17
Seattle: King Street Station Vicinity Map

The station is wheelchair accessible from King Street but is not yet in full compliance with ADA; once renovations are completed, it will be ADA compliant. There is a ticket office with agents on duty between 6:30 a.m. and 9:00 p.m. every day. General amenities include restrooms, telephones, and vending machines.

Local transit service is provided by Metro via bus service and the waterfront trolley. Metro, Community Transit, and Pierce Transit all operate bus service with stops adjacent to the station. More than 50 routes provide service to the station area.

Metro's International District Bus Tunnel Station is located two blocks east of King Street Station. Both I-5 and I-90 are accessible via the Fourth Avenue ramps. Amtrak Thruway Bus Service provides connecting service to Vancouver, BC and Spokane from King Street Station. King Street Station is easily accessible by bicycle and on foot. There are several commercial pay parking lots located adjacent to the station.

Edmonds, WA

The existing station is located at 211 Railroad Avenue and is owned by BNSF. It serves Amtrak and soon will also provide Sound Transit commuter rail service. A ticket agent is available at the station from 8 a.m. to 5 p.m. daily. Amenities include a restroom, vending machine, waiting area, and telephone. Bicycle racks are also provided.

Local transit service is provided by Community Transit with a bus stop located at the adjacent parking lot. The station is accessible by bicycle and on foot. There is a 265-stall pay parking lot adjacent to the station. The existing facility is not ADA compliant.

The City of Edmonds is currently working with WSDOT and Sound Transit to build a new intermodal facility. The preferred location of the new proposed facility would be at Point Edwards. The facility is adjacent to the Washington State Ferry terminal that provides connecting cross-Sound ferry service to Kingston, WA. The station will also serve as a stop for Sound Transit commuter rail service.

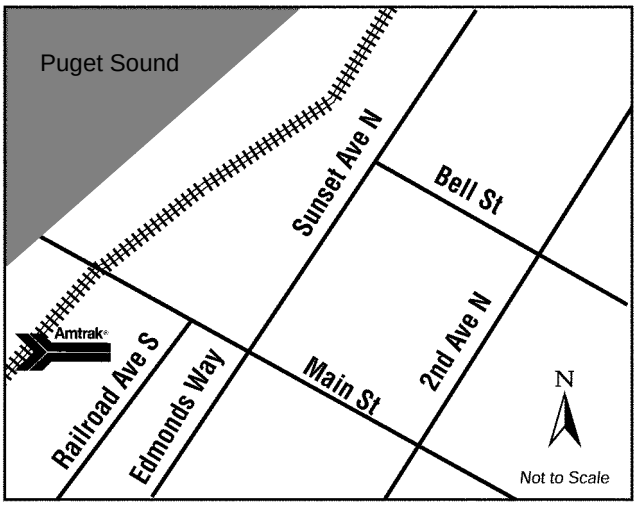


Figure 18
Edmonds: Train Station Vicinity Map

In order to accommodate park-and-ride and overnight commuters, a two-level, 460-space parking garage is also planned. In addition, 120 short-term parking spaces will be provided.

Everett, WA

The Amtrak station is located at 2900 Bond Street. The station was built at the turn of the century and remodeled in the early 1900s. The facility is wheelchair accessible although not in full compliance with ADA requirements. There is a ticket office in the station. The office is open from 7:15 a.m. to

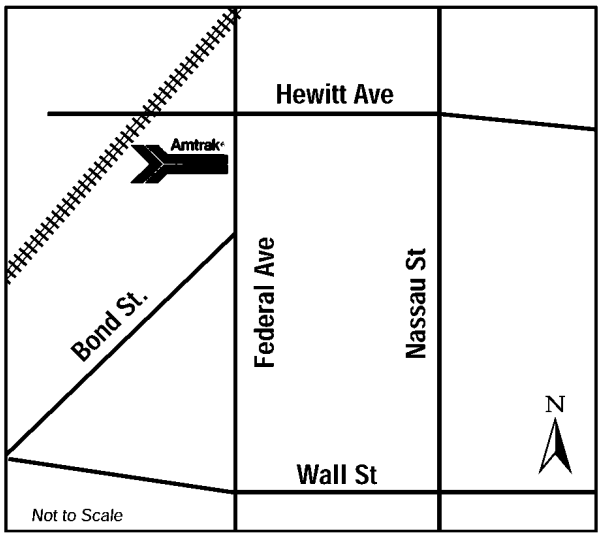


Figure 19
Everett: Train Station Vicinity Map

6:15 p.m. General amenities include restrooms and vending machines.

The existing station is served by Everett Transit. Paratransit services are also available from Community Transit. It is easily accessible on foot and by bicycle. There is a 50-stall, free parking lot in close proximity to the station.

Plans for a new station, the Everett Multimodal Transportation Facility, are being finalized. The site for the new station is bounded on the north by Pacific Avenue, on the west by Smith Avenue and Paine Street, on the south by 36th Street, and on the east by Hill Avenue. The proposed facility will serve Amtrak, commuter rail, Greyhound, public transit bus (Everett Transit and Community Transit), paratransit, charter bus service, taxi, bicycles, pedestrians, and shuttle service. It will be in compliance with ADA. A new parking facility is also planned, with 900 proposed parking spaces.

Mt. Vernon/Burlington, WA

The existing structure, located at 725 College Way, was designed and built as a temporary facility.

Mt. Vernon's proposed new downtown transportation center will serve as a bus transfer station, Amtrak station, and park and ride site. More than $5.5 million has been secured for the project. Station planners are currently working through the environmental review process and hope to begin construction on the station in the summer of 2000.

The new station will be located in downtown Mount Vernon. Skagit Area Transit (SKAT) will be the owner of the new facility.

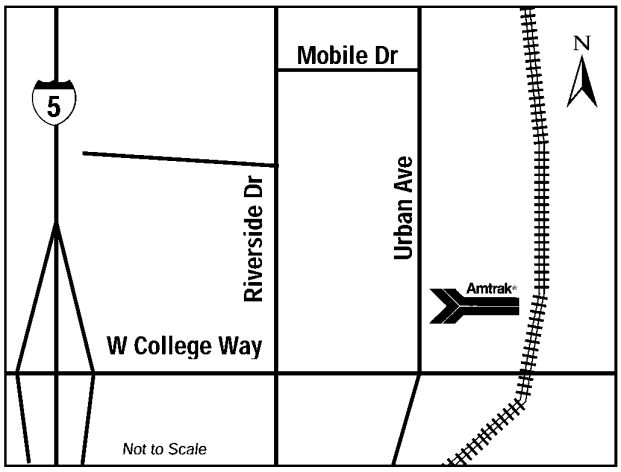


Figure 20
Mt. Vernon/Burlington: Train Station Vicinity Map

The existing facility is wheelchair accessible but not in full compliance with ADA. There is no ticket office or station amenities. There is a free, 60-stall parking lot to the west of the existing facility. There is transit service near the site, and its location is not readily accessible on foot.

Fairhaven Station (Bellingham, WA)

The train depot was dedicated in mid-1995. The building, located at 401 Harris Street, is a mixed-use commercial and rail station. The Port of Bellingham owns the facility.

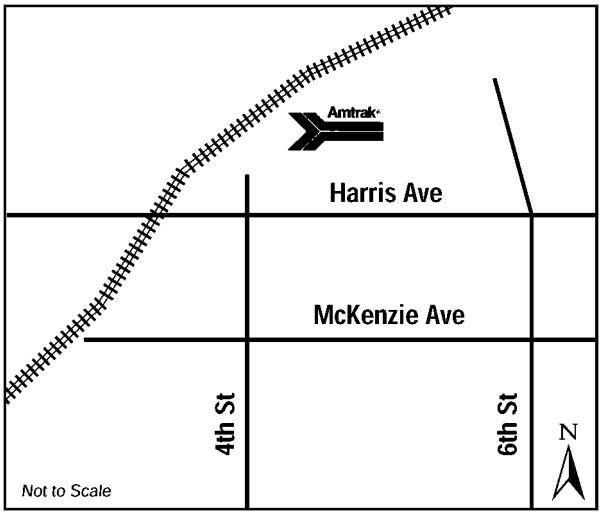


Figure 21
Bellingham: Fairhaven Station Vicinity Map

The facility is in compliance with ADA requirements. Facilities in the terminal include a central ticket booth, jointly shared with Greyhound, and an attractive, heated indoor waiting area with a view of the platform. Ticket booth hours are from 8:00 a.m. to 11:00 a.m. and 5:00 p.m. to 8:00 p.m. The waiting area includes telephones, snack machines and video games. In addition, there is a small coffee shop located in the building. Whatcom Transit Authority provides local transit connections at the station.

The facility is part of the Bellingham Fairhaven Cruise Terminal complex. This complex includes a separate cruise ship terminal, the train/bus station and public boating facilities. Although the cruise terminal and the train/bus station are separate buildings, they are within easy walking distance.

Pacific Central Station (Vancouver, BC)

The Vancouver, BC station is located at 1150 Station Street. It has undergone significant renovations since the late 1980s. Amenities include ticket agents, paid short-term and overnight parking, a restaurant, restrooms, and lockers. The station is wheelchair accessible.

The station can be easily reached on foot, by bicycle or automobile. Taxi service, Greyhound Canada, Maverick Stage Lines, and Pacific Coach Lines also serve the station. British Columbia Transit Skytrain has a stop located next to the train station. British Columbia Transit buses also provide easy access to areas throughout downtown and the region.

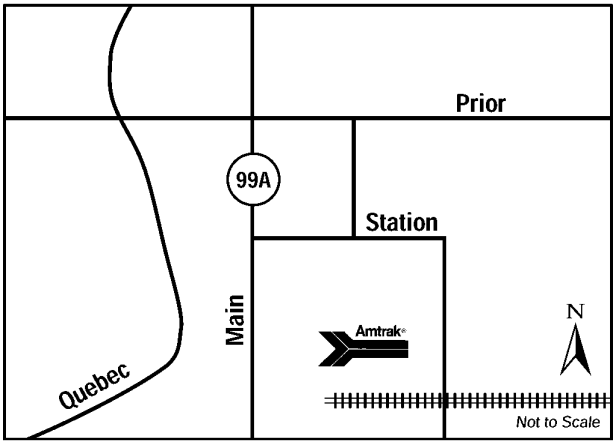


Figure 22
Vancouver, BC: Pacific Central Station Vicinity Map

Chapter Five
Environmental And Community Considerations

The feasibility of a plan and its implementation often depend on whether it will have impacts on the communities that it is intended to serve or if construction of its components will impact the surrounding natural environment.

The purpose of this chapter is to provide a summary and general discussion of the potential impacts that implementation of this Plan may have on the environment and the surrounding communities. Additional impacts, detailed mapping, mitigation information, and long-term impacts are presented in the Environmental Overview for the Pacific Northwest Rail Corridor, Volumes 1 and 2, December 1998 (Appendix A).

As discussed earlier in this Plan, it is impossible at this stage to identify all the specific project improvements that may be needed along the corridor. The Plan, therefore, only discusses potential types of projects that may be implemented over the next 20 years. Specific geographic locations are not identified at this time.

As WSDOT moves closer to each new service level, we will work with BNSF and our other partners to identify, plan and design the associated project improvements for the next service level. As project improvements are identified, WSDOT will initiate detailed environmental review of these projects and their proposed service level. Given the 20-year time frame of WSDOT's program, the Plan will be updated every two to three years to keep it current.

The Plan's Relationship To NEPA And SEPA

The state's rail program is governed by both the National Environmental Policy Act (NEPA) and the State Environmental Policy Act (SEPA). SEPA requires that most actions (policy or project) undergo an environmental review. As part of this review, a local government or state agency acts as the lead agency, ensuring that the process meets state law. WSDOT is the lead agency under SEPA for these rail projects.

Under a NEPA action a federal agency is the designated lead agency. It is the lead agency's responsibility to ensure that the requirements and intent of NEPA are fulfilled. In 1993, under the five-year, high-speed rail initiative, the Federal Railroad Administration was charged with the responsibility of overseeing the high speed rail program. It partnered with the Federal Highway Administration (FHWA, which has staff and resources in the Pacific Northwest), and gave FHWA the designation as co-lead. In addition, it was agreed that the Pacific Northwest Rail Corridor project should follow FHWA environmental procedures. A Memorandum of Understanding was developed among FHWA's Washington and Oregon Division, the Federal Railroad Administration and the state to address the roles and responsibilities for NEPA actions. These parties signed the Memorandum of Understanding in October 1995.

Extensive discussion with the Federal Railroad Administration, FHWA and the State Attorney General's staff has led to WSDOT's environmental approach. It was

determined that it would be difficult and impractical to analyze a 20-year program at the level of detail required by a NEPA/SEPA document, given the limitations imposed by conflicting policy and planning practices between the state of Washington and BNSF. However, to ensure that we consider the environmental resources along the corridor, WSDOT has developed an environmental overview approach. This overview approach will ensure early and meaningful evaluation of alternatives and avoid commitments to improvements before they are fully evaluated in each NEPA/SEPA environmental document.

It was determined that this approach fulfilled the intent of NEPA – to consider the environment at the planning stage – while giving the state flexibility to design an incremental service program. This environmental overview is not intended to replace project level environmental analysis.

What Environmental Areas Have Been Reviewed?

A number of environmental resources were reviewed as part of the analysis. This section discusses those resources and why it is important to consider them during project planning and design.

Waterways and Hydrological Systems

Our image of Washington State is a land of sparkling lakes, rivers and coastal waterways. The need to keep these waters clean is essential not only to the natural beauty and health of our communities but also to the survival of animal species and fisheries that depend upon these waterways for water and food.

In addition to surface waters, groundwater and aquifers are also critical elements of our environment. Groundwater is an important natural resource. For many residents of western Washington, groundwater is their sole source of water for all their daily water needs.

Although groundwater exists everywhere under the ground, some parts of the saturated ground contain more water than others. Such an area is called an aquifer. An aquifer is an underground formation of permeable rock or loose material that can produce useful quantities of water when tapped by a well. Aquifers provide drinking water for communities throughout the corridor.

Groundwater quality, like surface water quality, can be eroded by contaminants introduced by various domestic, industrial, and agricultural practices. Even where we might not use it directly as a drinking water supply, we must still protect groundwater, since it will carry contaminants and pollutants from the land into the lakes and rivers from which other people get a large percentage of their freshwater supply.

Floodplains are lowland areas adjacent to lakes, wetlands and rivers that are covered

by water during a flood. The ability of the floodplain to carry and store floodwaters needs to be preserved in order to protect human life and property from flood damage. Also, undeveloped floodplains provide many other natural and economic resource benefits.

Floodplains often contain wetlands and other areas vital to a diverse and healthy ecosystem. Undisturbed, they have high natural biological diversity and productivity. Floodplain vegetation provides important resting, feeding and nesting areas for many waterfowl species. River corridors are frequently used as flyways for migrating birds.

Floodplain vegetation and soils serve as water filters, intercepting surface water runoff before it reaches the lake, stream or river. This process aids in the removal of excess nutrients, pollutants and sediments from the water and helps reduce the need for costly cleanups and sediment removal.

Much of the rail corridor passes through floodplain or flood fringe areas.

Hazardous Materials

Finding and cleaning up hazardous materials along the corridor is for the benefit and safety of railroad workers, rail passengers and local residents. It is not anticipated that there will be exposure to potentially hazardous sites and materials during construction or operations. However, there is a possibility of finding a historical spill or dump site anywhere along the corridor. As the right-of-way is primarily used for freight hauling, any commodity being hauled along the route during the past 100 years could have spilled at any location. Recent legislation requires records and clean ups of such incidences. Spills prior to 1970 were generally not recorded.

Biological Resources/Ecology

Wetlands were once thought of as swampy, bug-filled "wastelands" that were useful only when they were filled in and developed for industry, housing, or businesses. Today, however, society is beginning to realize that wetlands are unique, natural areas, important to the ecosystem we all share, and thus they should be conserved and protected.

Wetlands occur wherever land is inundated, covered, or influenced by the presence of water. Wetlands support the growth of water-loving/tolerant vegetation that is adapted to wet sites.

At times of flooding, wetlands at the mouths of streams and rivers receive overflow water that is rich in nutrients and sediments. In the stillness or gentle motion of the wetlands, these sediments settle out and clearer water percolates into the groundwater. Thus, wetlands play an essential role in filtering nutrients and sediments out of water before it enters lakes and bays. By storing and slowly releasing flood water, wetlands also moderate the damage that flooding can cause.

Wetlands are located throughout stream and river systems, providing nutrient and sediment traps and flood control all along the way.

Wetlands often have very close connections to the groundwater system. Some may serve as important groundwater recharge areas. Others are receptors for significant amounts of groundwater discharge. If the underlying groundwater is contaminated, the consequences will be felt by the wildlife and

all other resources dependent on that wetland.

Numerous and diverse types of wetlands are located within the corridor, many which are at locations where the railroad crosses the many waterways.

The preservation of our wildlife, fisheries and vegetation has long been a priority of Washingtonians. The rail corridor lies adjacent to and crosses many water resources within the state. Most of the water resources are fish-bearing streams or rivers. Fish species in the corridor include Steelhead, Chinook Salmon, Coho Salmon, and Sockeye Salmon. Many of the fish species in Washington State have recently been listed (or proposed for listing) as threatened or endangered species under the Endangered Species Act. Of these species, those prevalent in our corridor include Coho Salmon, Searun Cutthroat, Chum Salmon, Steelhead, Bull Trout, and Chinook Salmon.

Wildlife habitat is abundant along the Columbia River and other lake and stream crossings along the corridor. Threatened and endangered species - and species of concern - likely to occur in the corridor vicinity include the peregrine falcon and osprey.

Vegetation throughout the corridor varies. It transitions from prairie grasses to wooded areas, with concentrations of Douglas fir, alder, and big leaf maples.

Air Quality

Polluted air can cause or worsen lung-related diseases - such as emphysema, chronic bronchitis and asthma - and can cause breathing difficulty and even death. Easily inhaled small particles, called particulate matter, are perhaps the most significant health concern related to poor air quality.

Polluted air can contribute to water pollution and lead to decreased visibility. It can also damage building materials, cloth and metals, trees, agricultural crops and other living organisms.

When a new transportation facility is proposed, it is imperative that we review the impacts that facility will have on our air.

Soils and Geology

Knowing the types of soils and geologic formations in a project area is very important. They determine the potential for landslides in the area and the area's susceptibility to vibration caused by trains. Thus, the types of soils dictate how a project should be constructed.

In addition, steep slopes throughout the corridor can be disrupted during construction of rail improvements. It is critical that these areas be identified as part of project planning.

Land Use

Land use refers to the types (uses) of buildings and land (for example, commercial, residential, agricultural) in an area. When new transportation projects are under consideration, it is important to ask two land-use related questions. First, is the proposed project compatible with surrounding land uses? For example, building a new freeway through a regional park would not be considered a compatible use.

Second, will existing land uses change as a result of the new transportation facility? Sometimes it is desirable to have the existing land use change, and sometimes it is not.

Throughout the corridor there are many different land uses. In Clark, Cowlitz and Lewis Counties, the land uses are primarily rural in nature. In the larger cities, such as Tacoma or Seattle, the land uses are concentrated with a mix of industrial uses and commercial uses. In Skagit and Whatcom Counties, there are many agricultural uses. In a few of the smaller communities some housing is located close to the railroad tracks.

Another aspect of land use is the development of comprehensive plans. In 1990, the Washington State Legislature adopted the state's first comprehensive Growth Management Act that is designed to help communities direct urban growth, reduce sprawl, and protect their resources. As part of the Growth Management Act, most communities are required to develop land use plans that will dictate the character and direction of growth within their cities. Changes to the passenger rail system and its facilities must now be compatible with these plans.

Farmlands

In our increasingly urbanized society, the federal government and the state of Washington have recognized the importance of preserving our diminishing farmland. It is imperative that projects minimize the disruption to these agricultural resources as much as possible.

Parks and Cultural Resources

Historic and archeological resources include historic buildings, districts, and archeological sites.

In 1966, this country recognized the importance of preserving these treasures of our culture through the National Historic Preservation Act. The Pacific Northwest Rail Corridor is rich in resources ranging from Native American burial sites and villages to the historic Fort Lewis Museum building, to the historic Fairhaven district in Bellingham. The corridor is also rich in park and recreational facilities. They range from small playgrounds to sandy beaches to large state facilities. The rail right-of-way

parallels numerous parks and recreational facilities.

Section 4(f) of the U.S. Department of Transportation Act of 1966, as amended, provides protection for significant publicly-owned parks, recreation areas, wildlife refuges, and historic sites. Transportation projects that adversely affect such resources may not be approved by the U.S. Secretary of Transportation unless a determination is made that there is no feasible and prudent alternative and that all possible planning has been done to minimize harm.

Social and Economic Resources (including Relocation and Environmental Justice)

In environmental planning, the technical area called social and economic resources includes review of access to social and educational facilities (religious institutions, schools, community centers), emergency vehicle access, community cohesiveness, and general economic conditions of the area.

When building a new project or implementing a new program, these elements play a vital role in the placement of the new facility or program. For example, it would be illogical to plan and implement a bus system if it did not go from a residential neighborhood to a commercial area. It is important to make sure the facilities can truly serve the community. In the case of intercity passenger rail, many of the communities cannot be served directly since they don't have a station in their area and they are not on the rail line. However, it is still important to look at the social and economic resources throughout the corridor to make sure that the rail system will not adversely impact the social structure of existing communities.

It is also important to look at the communities' views of safety because many residents feel that more trains and faster trains will make their communities less safe. Residents feel uncomfortable driving or walking over railroad tracks. Also, since some tracks separate neighborhoods from shorelines, many people must illegally walk over the tracks to get to the beach to fish, walk, or picnic.

When implementing a project, it is sometimes necessary to relocate families and businesses because the new transportation facility may either impact the home or business to the point where that property is no longer usable. It also happens that the new transportation facility may need more right-of-way to accommodate its design.

Another important aspect to consider when reviewing community cohesion and relocation is environmental justice. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was enacted on February 11, 1994. This Executive Order requires each federal agency, to the greatest extent practicable and permitted by law, to achieve environmental justice as part of its mission. Agencies are to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects, including interrelated social and economic effects of their programs, policies, and activities, on minority and low-income populations. In June 1997, the U.S. Department of Transportation implemented Order 5610.2 to establish procedures for U.S. Department of Transportation agencies, including FHWA and the Federal Railroad Administration, to comply with this Executive Order.

Visual Quality

The rail corridor program provides for improvements to passenger rail service. These improvements include constructing standard tracks and associated facilities along existing right-of-way that are not expected to impede visual quality. Some improvements include replacing existing grade crossing and bridge or overpass facilities.

Energy

Energy and its conservation, in general, are important factors to consider when implementing a transportation program. A passenger rail train consumes about 350,000 BTUs (British Thermal Unit) of energy per vehicle mile. This energy is in the form of diesel fuel, a hydrocarbon-based petroleum product. A typical automobile consumes about 6,200 BTUs of energy (in gasoline form) per vehicle mile. Due to its high passenger capacity, the passenger train carrying 56 or more passengers is more efficient than one single occupant automobile.

Noise and Vibration

An increase in noise can affect the peacefulness of your home, the sacredness of your religious institution, or the serenity of a park or historic site. It is important to measure changes in noise and to mitigate adverse affects.

Railroad noise varies because of operating factors and conditions. Operating factors include the type of train, train frequency, the numbers and lengths of trains, and operating speeds. The number of curves on the tracks, track maintenance, and the terrain in which the track is set - all can affect the noise level. In addition, grade crossings require certain whistles and warning bells. The significance of the noise depends on conditions and on the particular land uses and activities that occur along the corridor and their sensitivity to noise.

What Are The Potential Impacts?

Table 5, on the following page, presents a summary of general potential impacts identified in a typical environmental review. Since specific project improvements and their locations are not yet known, a "worst case scenario" is presented. This scenario presumes that all of the affected environmental features within the study corridor will be impacted by some type of construction project within the next 20 years.

Are There Specific Areas Of Concern?

Review of Table 5 indicates that certain environmental resources could be seriously impacted, depending upon the exact nature of the project improvements and their location. These areas of concern include wetlands, shorelines, threatened and endangered species, slope stability, and park/historic resources.

As WSDOT moves forward with project planning and design, it will pay special attention to these resources. Project alternatives will be considered to avoid adverse impacts to these resources.

What Are The Long-Term Impacts?

In addition to the Amtrak *Cascades* program, a number of related actions are also being implemented along the rail corridor. These include Sound Transit's commuter rail service and general expansion plans of the BNSF. Expansion and implementation of these actions have been

incorporated into capacity analyses for the corridor program. As such, future projects could potentially serve all of these programs. This environmental review looks at cumulative impacts that could relate to the many programs along the corridor.

Current environmental documents produced by Sound Transit also look at these long-term, cumulative impacts as they relate to the various programs being implemented. Their conclusions, as well as WSDOT's, indicate that there will not be significant secondary and cumulative impacts along the corridor.

Table 5
Summary of General Potential Environmental Impacts by County[1]

Resource	Clark	Cowlitz	Lewis	Thurston	Pierce	King	Snohomish	Skagit	Whatcom
Water Crossings	5	14	7	6	5	7	9	4	6
Miles of Shoreline		4			20	10	18	5	12
Hazardous Sites[2]	23	18	17	2	43	138	52	6	45
Wetlands[3]	Less than 500 acres	751 to 1,000 acres	500 to 750 acres	Less than 500 acres	Over 1,000 acres	751 to 1,000 acres	Over 1,000 acres	Less than 500 acres	751 to 1,000 acres
T&E Sites[4]	0	200 acres	0	0	230 acres	0	10 acres	72 acres	11 acres
Critical Habitat[5]	4	16	1	17	14	11	11	3	7
Unstable Slopes[6]	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Parks[7]	7	2	5	1	20	22	17	5	13
Historic Resources[7]	5	4	10	4	39	40	16	2	15
Targeted Populations[8]	1	4	1	0	5	13	2	0	3

1. All impacts are estimates. Information was developed using existing resources and mapping. Site specific review and field review were not performed as part of this analysis.
2. Known sites located within 2000 feet of the Rail Corridor.
3. These figures are approximations of wetlands (many located along shorelines) within 1000 feet of the Rail Corridor.
4. Threatened and Endangered (T&E) Sites: reflects the number of acres that are located within 1000 feet of the Rail Corridor.
5. Known Washington and Puget Sound Rare and Native Plant Sites, Wildlife Heritage Data Sites, and Seabird Colony Sites located within 1000 feet of the Rail Corridor.
6. Indicates areas with extensive amounts of unstable slopes along the Rail Corridor.
7. Located within 1000 feet of the Rail Corridor. Most resources are located on the National Register.
8. Per Executive Order on Environmental Justice, these figures reflect the number of census tracts along the Rail Corridor that have a population of 50% or more minority residents and/or populations where 20% or more of the residents have income below poverty level.

Chapter Six
Financial And Institutional Framework

Existing intercity passenger rail service in the state of Washington utilizes rail infrastructure owned by BNSF. Extensive analysis of current and future railroad operations reveals that many infrastructure improvements are needed to meet WSDOT's vision of increased passenger rail service while maintaining freight capacity needs. To meet service and capacity demands, WSDOT is working with our partners to identify projects, their costs, and financing options.

What Types Of Costs Will Be Required To Meet WSDOT's Vision?

The Amtrak *Cascades* program will require different types of investments. These investments are generally categorized as operational costs and capital costs.

Operational Costs

Operational costs are a direct function of operating the train service every year. Costs include fuel, labor, maintenance of trains and facilities, insurance, marketing and sales, and general administrative costs.

A passenger rail system not only incurs operating costs but also collects revenue from tickets purchased by passengers. Therefore, some costs are offset by revenue.

Capital Costs

Capital costs generally represent investment for improvements to railroad infrastructure, facilities and equipment. They normally result from a long-range plan that identifies the need for certain expenditures in certain years. The facility and equipment improvements identified in this Plan are considered capital costs. The purchase of new Amtrak *Cascades* trains is a current example of a system capital cost.

For each of the project improvement categories presented in Chapter 4 general capital cost estimates have been developed. The following section highlights some of these project improvement types and their estimated costs. However, depending upon the location and size of the improvement, costs within each general category can vary greatly. Reasons for this range in costs can include environmental mitigation, relocation of housing or businesses, clean-up of hazardous materials sites, or slope stabilization. The final length of the improvement (for sidings, bypasses, and main lines) will also affect the cost of the improvement. Improvements in urban areas are also typically more expensive because land is more expensive.

- ***Grade Crossings***. Capital costs for at-grade crossings can cost $300,000 or more; they can vary significantly depending upon site conditions.

- ***Signalization/Communication***. Upgrading a corridor to a Centralized Traffic Control signaling system may incur capital costs of $1 million per mile or more.

- ***Sidings.*** Capital costs for these kinds of improvements can vary greatly depending upon specific site conditions. A typical siding project may vary from $1 to $6 million per mile.

- ***Rail Storage Facilities*.** Capital costs for yard improvement projects vary based upon site conditions. Project capital costs could range from several million dollars to more than $50 million.

- ***Additional Main Line Tracks***. Capital costs for adding another main line to a corridor can vary tremendously based on site specific criteria. Costs may range from $1 to $8 million per mile.

- ***Crossovers and Turnouts***. Capital costs for turnouts vary depending upon the type of turnout. A low speed, manually operated turnout may be as low as $80,000 while a high-speed, power operated turnout may reach $550,000. Crossover costs can vary from $500,000 to $2 million.

- ***Bypass Tracks*.** Capital costs for bypass tracks can vary greatly depending upon specific site conditions. Costs may range from $1 million per mile to more than $10 million per mile, depending on terrain, right of way, and other conditions.

Specific costs for each project improvement will be developed as WSDOT moves through its program and implements each service level and associated capital investment.

What Will The Total System Cost?

The most recent capital cost estimates call for a $1.9 billion investment in the corridor over the life of the Plan. However, this cost estimate is for the corridor as a whole – a corridor that includes intercity passenger rail along with freight rail and commuter rail. In addition to the capital costs, passenger rail will require an additional $200 million for operations, for a total of $2.1 billion.

Many of the proposed corridor investments will provide significant benefits not only to intercity passenger rail but also to commuter service and freight. Therefore, it would be inappropriate to identify the full $1.9 billion in corridor investments as a capital cost for passenger rail.

For a $1.9 billion investment in capital:

- planned Sound Transit commuter rail would carry 3.2 million passengers annually;

- freight rail traffic could increase more than 50 percent; and

- approximately 2.2 million passengers would take intercity passenger rail trips annually.[9]

At the end of the 20-year period, it is assumed that no major capital requirements will remain for intercity passenger rail service. Based on the operations analysis, ticket-buying passengers will fund annual operating costs.

Capital Investments

To achieve WSDOT's vision of faster and more frequent service, it is imperative that improvements and investments be made throughout the corridor, from Oregon to British Columbia. In addition to the three jurisdictions, our other partners - BNSF, Sound Transit, and Amtrak - will also need

[9] Amtrak *Cascades* travelers could choose among 13 round trips per day connecting Seattle and Portland with stops in between. Frequent service extending north to Vancouver, BC and south to Eugene would also be available. Travelers would ride European-style trains between Seattle and Portland in as few as 2.5 hours and between Seattle and Vancouver, BC in as few as 3 hours.

to make capital investments in the corridor. To fulfill the rail system needs of all users over the next 20 years, annual public and private investments in the corridor will start at approximately $85 million and grow to more than $167 million by 2018. However, it should be recognized that, given the uncertainties involved in projecting future expenses, total costs can only be broadly estimated.

Table 6 provides an overview of capital investments required in the corridor over the next 20 years. These investments include planned track and facility improvements in addition to other corridor track investments, such as new trains and station improvements. As indicated, only a portion of the total corridor investment will benefit primarily passenger rail.

A significant share of the $1.9 billion invested in the corridor will be directed towards general corridor improvements, such as bridge upgrades and crossing improvements that will serve passenger rail, commuter rail, and freight traffic. A planning-level review of the projects proposed for the corridor indicates that approximately 75% of the total facilities costs can be attributed to intercity passenger rail for the entire corridor, including Washington, Oregon and British Columbia. This implies that approximately $1.5 billion

Table 6
Corridor Capital Costs (in Millions of 1997 Dollars)

	2003	2018	Total
Corridor Facilities Investments			
Oregon	$36	$156	$192
Washington	$164	$448	$612
British Columbia	$45	$610	$655
Total Corridor Capital Investments	*$245*	*$1,214*	*$1,459*
Miscellaneous Capital Costs			
Trainsets	$90	$135	$225
Land Acquisition	$13	$25	$38
Station Improvements	$12	$131	$143
Total Miscellaneous Capital Costs	*$115*	*$291*	*$406*
Total Rail Corridor Costs	$360	$1505	$1865

Source: Pacific Northwest Rail Corridor Operating Plan Years 2003 and 2018 (December 1997) and Economic Analysis for the Intercity Passenger Rail Program for Washington State 1998 – 2000 (September 1998).

of the total $1.9 billion in corridor investments is associated with improving intercity passenger rail service in the corridor.

What Will It Cost To Operate?

According to the Pacific Northwest Rail Corridor Operating Plan, the total annual cost of providing intercity rail service (operations and maintenance) is projected to range from today's approximately $29 million to more than $72 million at project buildout, excluding the effects of inflation. Operating revenues, which include income from passenger fares and on-board food and beverage sales, are currently meeting approximately 55% of regional costs.[10]

Estimates have been developed that highlight how the anticipated growth in ridership will build operating revenues, improve the system's farebox recovery, and reduce the required operational subsidy. Looking forward, with full implementation of the plan, operating revenues are expected to increase to approximately 65% of operating costs by the year 2003 and to more than 100% by program completion. This results in operating subsidy requirements of approximately $18.0 million per year to start, gradually decreasing until all operations costs are expected to be recovered from operating revenues. These estimates are expressed in constant 1997 dollars and are based on current operating experience and comparable corridor activity elsewhere in the Amtrak system.[11]

During this 20-year period, 27 million passengers are projected to travel a total of nearly 4.2 billion passenger miles. Cost and revenue estimates indicate that over this timeframe the program will operate with an average farebox recovery of nearly 80%, requiring just under $265 million in total operational subsidies.

Who's Going To Pay For It?

To answer the question of how we will pay for the expansion of passenger rail service, we must first identify who is being asked to make the investment. For the purposes of this evaluation, the state of Washington is assumed to be asking this question. Thus, the analysis focuses on the elements of the program that could be WSDOT's responsibility. The balance of the funding is expected to come from the other principal partners (in particular British Columbia and the state of Oregon) and in-state partners (such as Sound Transit and the freight railroads). It is important to note that no long-term financial commitments have yet been made by any of these entities.

How Will Costs Be Allocated?

At this time, the issue of cost allocation cannot be resolved. Therefore, for the purposes of analyzing the financial implications for the state of Washington, a division of cost responsibility among the principal partners has been made. It is assumed that WSDOT will be responsible for facility improvements located in the state of Washington, plus half of the rolling stock requirements and half of the annual

[10] It should be noted that this analysis excludes the impact of Amtrak's *Coast Starlight* service. Although this train does serve passengers traveling within the corridor, it is primarily designed to serve the major cities of the west coast and therefore was not included in the analysis of corridor costs and subsidies.

[11] Berk and Associates, Economic Analysis for the Intercity Passenger Rail Program for Washington State, September 1998.

operating subsidies. The rolling stock and operating subsidy requirements assume that these costs will be shared equally between Washington and British Columbia for the Seattle-Vancouver, BC service and between Oregon and Washington for the Seattle-Portland/Eugene service.

Allocation of in-state costs is also necessary. These costs include all necessary improvements to ensure the efficient movement of intercity passenger rail and freight rail in the corridor plus new commuter rail service in the central Puget Sound area. Many projects will benefit all of these entities. The actual cost allocation will be determined on a project-by-project basis and will be the result of negotiations among WSDOT, Sound Transit and the railroads.

For planning purposes, a rough allocation has been prepared. Table 7, on the following page, presents the criteria that were applied to the corridor projects within Washington. The Sound Transit District [also called the Regional Transit Authority (RTA) District] is a taxing district approved by Puget Sound area voters in 1996. The counties involved are Snohomish, King, and Pierce.

Table 8, also on the following page, shows a preliminary cost allocation for WSDOT based on the identified criteria. It is important to note that this allocation is for illustrative purposes only. At this time, there has not been any formal agreement among the various interested parties regarding the issue of cost sharing for proposed improvements. These figures are for use only in developing a preliminary financial analysis for the Washington elements of the proposed program. According to this analysis, the total funding commitment required during the development of the program is $2.1 billion, expressed in 1997 dollars. Of this amount approximately 42% or $871.25 million can reasonably be allocated to WSDOT.

Past And Future Funding Sources

One of the key features of the Pacific Northwest Rail Corridor program is the fact that passenger rail service will connect three major metropolitan areas across two states and one Canadian province. In addition, rail service is provided by Amtrak on right-of-way owned by BNSF. As such, responsibility for funding the corridor improvements and any operating subsidies does not automatically fall to a single jurisdiction.

Partnerships

Given the size of the investments required, securing timely and adequate funding will be a major challenge for each of the principal participants. It will be important to look for opportunities to pool capital funds with funds from other potential program beneficiaries.

Potential partnerships include public-public partnerships; Sound Transit; private railroads; real estate interests; contract service providers; port districts; and other local options.

Discretionary Federal and State Transportation Funds

There are a number of separately administered discretionary funding sources that could be tapped for elements of the intercity rail program. The competition for these funds is fierce and, given the current fiscal environment, is likely to remain so for the foreseeable future.

Table 7
Cost Allocation Criteria for Capital Costs in Washington State

Project Location	Primary Project Goal	WSDOT's Share	Partners' Share
Outside of the Sound Transit District	To meet passenger rail requirements	100%	
Outside of the Sound Transit District	To meet general capacity requirements	50%	50%
Within the Sound Transit District	To meet passenger rail requirements	50%	50%
Within the Sound Transit District	To benefit all rail users	33%	66%

Source: Berk & Associates, Economic Analysis for the Intercity Passenger Rail Program for Washington State, September 1998.

Table 8
Preliminary Washington State Department of Transportation Cost Allocation (in Millions of 1997 US Dollars)

	Corridor Total	***WSDOT's % Share***	**WSDOT 98-03**	**WSDOT 04-18**	**WSDOT Total**
Facilities	*$1,459*	*32%*	$125.0	$340.0	$465.0
Land and Stations	*$181*	*100%*	$25.0	$156.0	$181.0
Trainsets	*$225*	*50%*	$45.0	$67.5	$112.5
Total	*$1,865*	*41%*	$195.0	$563.5	$758.5
Operating subsidies (1998-2018)	*$225.5*	*50%*	NA	NA	$112.75
Total requirements	*$2,095*	*42%*	NA	NA	$871.25

Source: Berk & Associates, Economic Analysis for the Intercity Passenger Rail Program for Washington State, September 1998.

The following is a list of the major programs and sources of potential discretionary transportation funding: Transportation Equity Act for the 21st Century; the Federal Transit Administration; the Federal Railroad Administration; the Swift Rail Development Act; Amtrak; the Central Puget Sound Public Transportation Account; the Transportation Improvement Board; and the Rural Mobility Grant Program.

Is It Worth The Investment?

In the fall of 1998, an independent study was performed to objectively analyze whether passenger rail is a competitive and viable transportation alternative. This economic analysis employed a methodology called "cross-modal analysis."

This analysis was designed to aid policy-makers seeking to establish funding priorities for scarce transportation resources. The analysis looked at the total public and private costs of passenger rail, highway, and air travel; it compared those costs to the amount of use for each system.

This analysis did not attempt to evaluate the marginal cost of a particular trip and so is not intended as a commentary on potential mode choice decisions. This analysis was also not intended to address all of the issues regarding transportation costs and investments. It merely aimed to establish a framework to compare different intercity transportation systems and to inform the ongoing funding priority deliberations.

General Approach

When asked to consider the full costs of transportation, most people would identify both private and public expenditures[12] that support each travel mode. Fewer individuals would consider the important role that travel time[13] and external costs[14] play in determining overall costs. Because these latter elements do not require out-of-pocket expenditures by either private or public groups, they are frequently overlooked. However, the hours dedicated to travel represent time lost for either work or leisure, and the external costs associated with air pollution, noise impacts, and accident losses are important policy considerations that should not be ignored.

The analysis took the out-of-pocket expenditures of operations, together with the less obvious costs associated with intercity travel and externalities, and compared them among the three intercity passenger modes of air, highway and rail.

Since each mode relies on a different form of travel - highway travel consists of using personal cars and either driving alone or with passengers; airplanes travel in the air and can carry hundreds of passengers; and trains travel on tracks and also carry hundreds of passengers - it is essential to find a uniform measurement. Economists and transportation planners have agreed on a common measurement, known as a passenger mile, to create a "level playing field" among the different modes. This permits a consistent measure of total system usage.

A passenger mile is determined by taking the total number of passengers (in a plane, train, or car) and multiplying that number by the total number of miles traveled. The number of total passenger miles is used to calculate cost per passenger mile. The total component cost (for example, yearly airport

[12] Such expenditures typically include the costs associated with maintaining and operating the facility, often referred to as operational costs.

[13] Travel time simply refers to the amount of time it takes to get to your destination.

[14] External costs refer to the elements of your trip that aren't "out-of-pocket" expenses. These are often invisible expenses associated with the human environment, such as the impact to our air and water quality as a result of emissions and water run-off from our transportation systems.

operational costs) is then divided by the yearly total passenger miles.

Findings of the Cross-Modal Analysis

The cross-modal analysis was performed in two steps. First, the direct and indirect operating costs (direct operating costs, travel time and externalities) were compared among the three intercity modes. Following this analysis, a comparison of the full costs, including annualized capital costs per passenger mile, was performed. The approach of separating capital and operating costs allowed for a direct comparison among the modes without the potentially distorting effects of the current capital costs.

Since passenger rail service is currently a relatively minor element in the intercity travel market, substantial investments will be required to bring it into a competitive position in terms of service frequency and travel time. The other two modes are well established and require a smaller infusion of capital.

Operating Costs

When these methods are applied to intercity passenger rail in the Pacific Northwest Rail Corridor, results reveal that passenger rail service is comparable to both air and highway travel. This approach indicates that by 2020 rail costs will range from $0.97 to $1.27 per passenger mile, while highway travel is estimated to cost from $1.42 to $1.79 per passenger mile. Table 9 shows the results of the operating cost comparison.

Capital Costs

A comparison of capital costs poses a series of complications that are not raised in the analysis of operating costs. Operating costs represent recurring expenses that can be easily identified and tracked over time. Although capital investments may be incurred at a particular point in time, they must also be allocated across time because they represent facilities that have useful lives of 5 to 30 years. In addition, facilities support both passenger and freight traffic, so costs must be appropriately divided among all uses. Furthermore, because the current planning horizon is less than 20 years, current expenditure plans may not capture the full capital costs of each mode. The following are additional observations regarding the integration of capital into the overall analysis of cost effectiveness:

Table 9
Comparison of Direct and Indirect Operating Costs Per Passenger Mile

	Automobile		Passenger Rail		Air Travel	
Year	Low	High	Low	High	Low	High
1998	$ 0.59	$ 0.73	$ 0.49	$ 0.60	$ 0.63	$ 0.72
2000	$ 0.63	$ 0.79	$ 0.51	$ 0.63	$ 0.68	$ 0.77
2005	$ 0.77	$ 0.98	$ 0.56	$ 0.72	$ 0.84	$ 0.95
2010	$ 0.95	$ 1.18	$ 0.68	$ 0.86	$ 1.02	$ 1.16
2015	$ 1.15	$ 1.45	$ 0.82	$ 1.05	$ 1.24	$ 1.41
2020	$ 1.42	$ 1.79	$ 0.97	$ 1.27	$ 1.52	$ 1.72

Source: Berk & Associates, Economic Analysis for the Intercity Passenger Rail Program for Washington State, September 1998.

- Rather then reflecting the inherent advantages of one mode over another, short-term capital investment requirements can be heavily influenced by past investment decisions. If infrastructure and facilities have been allowed to age and deteriorate, then significant capital expenditures may be needed in the immediate future. These expenditures could increase the apparent costs of the affected mode of travel, but they may not accurately reflect its long-term cost effectiveness.

- Required capital investments also reflect differences in the relative maturity of each transportation alternative. As discussed earlier, the markets for highway use and air travel are both mature; they have benefited from a long history of public and private investment. In contrast, the objective of the Pacific Northwest Rail Corridor program is to reintroduce intercity passenger rail as a viable alternative in the I-5 corridor. It will probably take some time to build its market share. If rail travel is to successfully compete with air and highway travel, public investment may be needed in the short term to build the necessary infrastructure to offer competitive service.

- A comparison of planned capital expenditures can be misleading because it does not offer direct insight into the long-term levels of capacity that will be available for each mode. Planned improvements in air and rail facilities might be used to support an expansion of service in the years beyond 2015. The current analysis relies on projections of demand to estimate relative cost effectiveness. However, the availability of unused capacity will have value in the years beyond the current planning horizon, and the cost of expanding capacity will also be different for each mode.

Capital Cost Comparisons

Highway capital costs over the current period of study do not exceed $0.012 per passenger mile, but they reach more than $0.60 per passenger mile for rail. Table 10 presents these findings.

Table 10
Comparison of Capital Costs (Dollars Per Passenger Mile)

Year	Automobile	Passenger Rail	Air Travel
1998	$0.00	$0.11	$0.09
2000	$0.00	$0.21	$0.10
2005	$0.01	$0.30	$0.11
2010	$0.01	$0.41	$0.11
2015	$0.01	$0.56	$1.12
2020	$0.02	$0.55	$0.15

Source: Berk & Associates, Economic Analysis for the Intercity Passenger Rail Program for Washington State, September 1998.

This variation is largely driven by three key factors:

- Rail is in a different place in the investment cycle. While highway and air are mature systems, rail is still in the midst of building a system infrastructure.

- Projected levels of ridership for each mode. Total highway capital costs ($2.3 billion) exceed those for rail ($1.5 billion). However, given the 15.5 billion vehicle miles projected for the I-5 corridor in 2015, average costs are significantly lower for highway travel.

Table 11
Full Cross-Modal Comparison of Operating and Capital Costs
(Dollars Per Passenger Mile)

	Automobile		Passenger Rail		Air Travel	
Year	Low	High	Low	High	Low	High
1998	$ 0.59	$ 0.73	$ 0.60	$ 0.71	$ 0.72	$ 0.81
2000	$ 0.63	$ 0.79	$ 0.72	$ 0.84	$ 0.78	$ 0.87
2005	$ 0.78	$ 0.99	$ 0.86	$ 1.02	$ 0.95	$ 1.06
2010	$ 0.96	$ 1.19	$ 1.09	$ 1.27	$ 1.13	$ 1.27
2015	$ 1.16	$ 1.46	$ 1.38	$ 1.61	$ 1.36	$ 1.53
2020	$ 1.44	$ 1.81	$ 1.52	$ 1.82	$ 1.67	$ 1.87

- The levels of investment in rail and highway are designed to meet different level-of-service goals.

The final step of the cross-modal analysis was to combine the total operating costs per mode with the capital costs.

Conclusions

The results of these combined costs are shown in Table 11. The total investment per mode is fairly close for highway and rail.

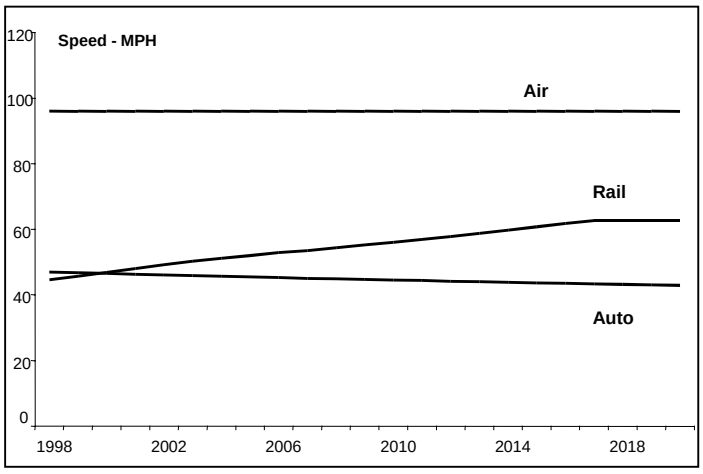


Figure 23
Current and Future Level of Service –
Comparison Among Intercity Modes

However, the investment in the rail system will result in significant improvements in the level of service, both in terms of frequency of service and reduced travel times. The investments in the highway system will not have a significant impact on the degradation in the overall level of service, as average speeds are projected to continue to slow throughout the period. Figure 23 illustrates this point.

The cost per passenger mile for rail travel will begin to decrease in the years beyond the current planning horizon. This is because the rate of capital investment is expected to be significantly lower in the years beyond 2018. By then improvements will be complete and service objectives met; therefore, future capital needs are likely to be limited to rehabilitation and maintenance needs.

Chapter Seven
Implementation

WSDOT's passenger rail program is already well on its way to achieving service and ridership goals for the year 2005. Additional travel time reductions and more frequent service were implemented in 1998. New trains replaced outdated and leased equipment in 1999. In addition, needed studies have been completed or are currently underway. These studies provide the foundation for the physical and service improvements that will be implemented by the year 2005. Studies include:

- ***Release and Update of this Plan.*** This Plan was updated from the Revised Plan released in December 1998. Incorporated into this revision are comments received from the public, stakeholders and elected officials. This revised Plan will be used as a guide to move forward into future service level expansion.

- ***Operational Analyses.*** In-depth operational analyses and ridership projections have been completed. These studies take into account the newest methodologies developed by the federal government. This information has been incorporated into this Plan and is available from the WSDOT Rail Office. The report was completed in December 1997.

- ***Financial Review and Funding Sources.*** The economic analysis provides an updated and more precise overview of capital and operational costs as well as a cross-modal comparison for policy makers to use as a guide for investment decisions. The report also highlights funding sources and recommends potential cost allocations for project improvements. This information has been incorporated into this Plan and is available from the WSDOT Rail Office. The economic analysis was released in September 1998.

- ***Environmental Review.*** WSDOT is currently preparing an environmental review of 1999-2004 construction projects. This review identifies potential environmental impacts in the vicinity of the five year projects and recommends mitigation. The analysis will be issued in mid-2000.

- ***Consumer Market Research.*** Market research is routinely conducted to ensure that WSDOT's plans for increased service meet the needs of the ticket buying passenger. Examples include on-board passenger research and potential customer research.

- ***Cost Allocation.*** WSDOT is currently in the process of working with its partners to identify cost responsibility for each project.

- ***Public Involvement.*** The public is routinely invited to help improve Amtrak *Cascades* service, to participate in the development of this Plan and to shape other state rail program policies. Examples include customer comment cards aboard Amtrak *Cascades* trains; open houses; "The Future is on Track" live call-in television program; advisory groups; interviews conducted on an as

needed basis; and email messages sent to rail@wsdot.wa.gov. Contact the WSDOT Rail Office for the most recent copy of its public involvement plan.

How Will Future Expansion Of Passenger Rail Service Be Implemented?

To continue with passenger rail expansion, WSDOT will update operational, financial, and environmental information to provide accurate information to taxpayers and legislators. Steps that will be taken periodically include:

- Review of current market demand;
- Updated track capacity analysis;
- Revised operational analysis;
- Identification of track and facility improvements necessary for increased service;
- Identification of funding sources;
- Negotiations and agreement for cost allocation of project improvements;
- Public involvement;
- Consumer market research;
- Revision of this Plan; and
- Environmental studies for project improvements.

Previous Studies And Other Reference Sources

This section presents a list of studies that have been prepared or commissioned by the Washington State Department of Transportation, the Oregon Department of Transportation, and the Province of British Columbia. Following this list, references used to develop this document are listed.

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Glossary

Active Warning Device Flashing lights and/or gates used at grade crossings.

Advance Warning Signals A sign used along a roadway to warn that a roadway-rail grade crossing is ahead.

Aquifer An underground geological formation containing usable amounts of groundwater that can supply wells and springs.

At-Grade Crossing The surface where the rail and a roadway (or pathway) cross at the same level.

Ballast Material selected for placement on the roadbed for the purpose of holding the track in place.

Best Management Practices (BMPs) Used during construction, methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources.

BTU (British Terminal Unit) Standard measure for heat energy.

Bypass A track that goes around other rail facilities (bypasses them). A bypass may be as simple as a track that goes around a small yard, or may be as significant as a complete route revision.

Capital Costs Non-recurring costs required to construct (or improve) the rail line. Capital costs include the purchase of vehicles, track improvements, station rehabilitation, and design and administrative costs associated with these improvements.

Centralized Traffic Control A computerized system that uses remote controls to change signals and switches along a designated portion of railroad track.

Chokepoint An area along the railroad track that is often congested, making it difficult for trains to pass uninterrupted.

Commuter Rail Service between a central city and its suburbs, running on a railroad right-of-way. Examples include the Sound Transit's commuter rail system in Puget Sound, Metrolink in Los Angeles, California and British Columbia's West Coast Express.

Consist The number of vehicles forming a train.

Continuous Welded Rail Rails welded together in lengths of 400 feet or more.

Corridor Train Intercity rail passenger service that links major transportation centers within a limited geographic region. Trains that only travel between Vancouver, BC and Eugene, OR are called corridor trains.

Crossover (and Power Crossover) A set of turnouts connecting multiple tracks. A crossover allows a train to move from one track to another. A power crossover is controlled by Centralized Traffic Control.

Deficiencies Areas along the track that cannot handle expected increased train frequencies.

Derail (and Power Derail) A device on the tracks used to remove a non-moving train from the tracks in case of an

emergency. A power derail is operated by Centralized Traffic Control.

Dispatcher The individual who plans and controls the movement of trains.

Double Track Two sets of main line track located side by side, most often used for travel in opposite directions, like roadways.

Environmental Assessment (EA) An environmental analysis prepared pursuant to the National Environmental Policy Act (NEPA) to determine whether a federal action (or project with federal investment) would significantly affect the environment and thus require a more detailed environmental impact statement.

Environmental Impact Statement (EIS) A document required by federal and state agencies under the National Environmental Policy Act (NEPA) and Washington State's Environmental Policy Act (SEPA). An EIS is required for major projects or legislative proposals that may significantly affect the environment. A tool for decision making, it describes the positive and negative effects of the undertaking and identifies alternative actions.

Exclusive Right-of-Way A right-of-way that is to be used only for the rail line (either freight or passenger or both). It is usually completely grade-separated from other types of vehicles.

Fill Sections Depositing of dirt, mud or other materials into aquatic areas to create more dry land.

Five Year Project WSDOT designated track improvements along the Pacific Northwest Rail Corridor for design and construction within the next five years (by 2003).

Flashing Light Signals Used with the crossbuck signs at railroad crossings. When the lights are flashing, the motorist or pedestrian must stop.

Floodplains The flat or nearly flat land along a river or stream that is covered by water during a flood.

Frequency A term used to describe the level of rail service. For intercity rail, frequent service means that trains serve a particular station at least every four hours.

Gates Used with flashing signals at certain crossings to warn that a train is approaching.

Geometrics An engineering term that refers to the design of the tracks.

Grade Crossing The area along the track where a roadway or pathway crosses.

Grade-Separated Crossing lines of traffic that are vertically separated from each other (i.e., a roadway that goes over a railroad track).

Groundwater Supply of fresh water found beneath the earth's surface, usually in aquifers, that supplies wells and springs.

Habitat The place where a population (human, animal or plant) lives and its surroundings.

Hazardous Materials Material, often waste, that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, explosive, or chemically reactive.

High Speed Rail Trains like the famed Japanese Bullet Train, well known in European and Asian countries. These trains travel at speeds greater than 125 miles per hour on exclusive right-of-way and are economically feasible only in the world's densely populated areas.

Intercity (Passenger) Rail Service connecting central city to central city on a railroad right-of-way in densely traveled corridors. Amtrak's metroliner service between Washington, DC and Boston is a well-known example of higher-speed intercity rail. Locally, the Amtrak *Cascades* connecting Vancouver, BC to Seattle is an example of intercity passenger rail.

Intermodal The use of different types of transportation modes to move freight shipments and people, i.e. ships, trains, buses and trucks.

Light Rail Carries a light volume of traffic. "Light" refers to the number of riders that the train can carry, not the weight. Light rail may share right-of-way on a roadway or operate on exclusive right-of-way and can have multi-car trains or single cars. Trolley cars and Portland, OR's MAX system are examples of light rail.

Liquefaction When a solid changes to a liquid. Often the case with some soils, resulting in landslides.

Lock Switch (and Electric Lock Switch) Operated by Centralized Traffic Control to regulate when trains can enter on or off the tracks.

Long Distance (Long Haul) Train A passenger train that serves major transportation centers within and beyond those of a corridor train. An example is Amtrak's *Coast Starlight* that travels between Los Angeles and Seattle.

Main line (Main Line) A railroad's primary track that usually extends great distances. It usually carries both freight and passenger trains.

Mitigation Measures taken to reduce adverse impacts on the environment.

National Pollution Elimination Discharge System (NPDES) A provision of the Clean Water Act that prohibits discharge of pollution into waters of the United States unless a special permit is issued by the U.S. Environmental Protection Agency, a state agency, or where delegated, a tribal government.

Nonpoint Source Pollution sources without a single point of origin. The pollutants are generally carried off the land by stormwater.

Operational Costs (Operating Costs) Recurring costs of operating passenger service. These costs include wages, maintenance of facilities and equipment, fuel, supplies, employee benefits, insurance, taxes, marketing and other administrative costs.

Passive Warning Device Signs or markers used at all grade crossings.

Patronage The number of people carried by the passenger train during a specified period.

Pavement Markings Painted on the pavement in advance of a railroad highway crossing, to warn the motorist or pedestrian of the rail crossing.

Positive Train Separation A new railroad communication system, using high tech equipment to monitor train locations.

Rail Yard A system of tracks within defined limits, designed for storing, cleaning, and assembling (to each other) rail cars.

Railroad Crossbuck A type of sign found at all public railroad crossings. This sign should be treated as a yield sign.

Railroad Tie The part of the track, often wood or concrete, where the rails are spiked or otherwise fastened.

Rapid (or Heavy) Rail An electric railway that carries a large volume of people on exclusive right-of-way. Subways like San Francisco's BART or Washington, DC's Metrorail are examples of rapid (or heavy) rail.

Recharge Area A land area in which water reaches the zone of saturation from surface infiltration, e.g. where rainwater soaks through the earth to reach an aquifer.

Reliability A service measure in transit planning, if a train or bus arrives within 10 minutes of its scheduled time, it is considered reliable. Reliability can be impacted by congestion on the tracks, delays at stations, and equipment malfunction.

Ridership The number of people carried by the passenger train during a specified period.

Right-of-Way The horizontal and vertical space occupied by the rail service. In the Pacific Northwest Rail Corridor, BNSF owns the right-of-way. Amtrak, WSDOT, and Sound Transit run their trains on BNSF's right-of-way through operating agreements.

Rolling Stock Train vehicles.

Runoff That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface water. It can carry pollutants from the air and land into receiving waters.

Siding An auxiliary track located next to a main line that allows a train to move out of the way of an oncoming train. Sidings are also used to store trains or to add/subtract rail cars.

Switch A set of levers and gears that guides a train over a turnout or crossover. The levers and gears are moved manually or electronically.

Travel Time The elapsed time between a trip's beginning and end. It includes travel, transfers, and waiting time.

Turnout A set of tracks that connect the main line to a siding or rail yard. A turnout allows the train to move on or off the main line.

Wetland An area saturated by surface or groundwater with vegetation adapted for life under those soil conditions. Examples of wetlands are swamps, bogs, and estuaries.